



Digitized by the Internet Archive
in 2016


~~~~~

THE

JOURNAL

OF

THE ASIATIC SOCIETY

OF

BENGAL.

—

VOL. II.

~~~~~


THE
JOURNAL
OF
THE ASIATIC SOCIETY
OF
BENGAL.



EDITED BY
JAMES PRINSEP, F. R. S.
SECRETARY OF THE ASIATIC SOCIETY.

VOL. II.

JANUARY TO DECEMBER,
1833.

“It will flourish, if naturalists, chemists, antiquaries, philologists, and men of science, in different parts of *Asia*, will commit their observations to writing, and send them to the Asiatic Society at Calcutta; it will languish, if such communications shall be long intermitted; and it will die away, if they shall entirely cease.”

SIR WM. JONES.

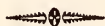
Calcutta :

PRINTED AT THE BAPTIST MISSION PRESS, CIRCULAR ROAD

SOLD BY MESSRS. THACKER AND CO. ST. ANDREW'S LIBRARY.

1833.

P R E F A C E.



ON completion of this second volume of the JOURNAL OF THE ASIATIC SOCIETY, the Editor feels it to be due to his subscribers, as well as to himself, to lay before them as briefly as possible, the results of the arrangements which he contemplated carrying into effect at the conclusion of the last volume;—more especially as a somewhat erroneous estimate of the cost and circulation of the JOURNAL found admission into a late notice of the Indian Periodical Press, drawn up by the Editor of one of the morning papers. The JOURNAL is not published, as there stated, by the Asiatic Society, but solely at the cost and responsibility of the Secretary, who was Editor of it before he enjoyed the honour of an election to that office. Since there never has been the least view to profit, either in the GLEANINGS or in the present work, there can be no object whatever in concealing any information respecting its publication; and it may be useful hereafter to find on record a note of the expences of printing, and the difficulties against which a Journal exclusively scientific has had to contend, as well as the advantages which it has enjoyed, in India at the present time. The following particulars have therefore been extracted from the accounts of the two years now terminated.

The amount of subscriptions to the JOURNAL at one rupee per number, including two extra numbers, in 1832, was Rs. 5148 8

From this, deducting 20 per cent. commission paid to Messrs. Thacker and Co. for circulating it, 1028 11

There remained net subscriptions available, Rs. 4114 13

The Baptist Mission Press charged for printing and stitching 500 copies, Rs. 3742 10

And the 15 plates cost with printing, 416 5

Total 4178 5

The result of the first year exhibits a sufficient accordance between outlay and return. Of the amount subscribed however, only Rs. 3786 13 have been collected up to the present time, so that in fact there was a deficit of Rs. 392 2.

The alterations which the Editor proposed and completed for the second year were :—

1. The saving of nearly half of the commission paid for the mere circulation of the work (without responsibility), by undertaking that duty with the aid of his establishment as Secretary of the Asiatic Society;

2. As a return for this favor, he proposed circulating the Journal gratis to such of the paying members as should express a desire to take it in.

The effect of this scheme has been as follows :

Fifty members of the Society have availed themselves of the privilege, which has made a deduction to the same amount from the monthly receipts. The number of copies circulated, including those sent to subscribers and societies in Europe, is about 450.

The number of paying subscribers on the list, is 320, which at 1 R. per month, (including one extra number of Buchanan,) would give Rs. 4480.

The expenses of printing 500 copies, of 670 pages,

at 4-5 per page, may be stated at	Rs. 2,890
144 pages of Buchanan, at 4-8 per page,	648
Covers, table work, &c. charged extra,	250
40 pages of Appendix, at 5 Rs.	200
28 plates (18 lithographs, 10 engravings*),	480
Establishment for circulation,	600

— 5,068

Leaving a loss on the year of Rs. 588, or nearly as much as the subscriptions of the members exempted from paying.

But it must be mentioned, and mentioned with a degree of disappointment which is almost disheartening, that of the flattering list of sub-

* For these the cost of printing and paper only is charged.

scribers above given, 70 have not paid any part of the year's subscription, and as many more are still in arrears; so that a balance of Rs. 1321-8 still remains to be collected. The actual state of the concern is therefore by no means so favorable as could be wished, for it leaves the Editor out of pocket upwards of 2000 Rs. as the reward of his labour for two years ! But we will not for a moment suppose that the balances outstanding are not recoverable : on the contrary the principal difficulty lies in the distance, and the supposed want of a mode of remittance.—Many subscribers are not aware, that letters containing hoondees for the amount may be transmitted *post free* to the Editor.

It will be remembered, that the Bengal Government were pleased to bestow the privilege of free postage on the *GLEANINGS* and on the *JOURNAL*, on condition of the publication of the late Dr. Buchanan's Statistical Reports. Under the impression (justly formed) of a corresponding increase of circulation, consequent upon this liberal boon, it was resolved not to incorporate these records in detached notices in the *JOURNAL*, nor to diminish from its original matter*, but to publish them as a separate work ; and one volume has accordingly been completed, containing 356 pages, which at 4-8 per page have cost Rs. 1,602

And a reprint of the first 108 pages, which became necessary on the subsequent extension of the edition from 300 to 500 copies,

216

Total, Rs. 1818

This expence has been incurred therefore on account of Government, in return for the postage saved, not to the work, but to the subscribers of the *JOURNAL*. On the completion of the first volume of *BUCHANAN*, a second extra volume of an official nature on the Monetary System was commenced, of which 50 pages have been printed with 3 plates, being in fact an expence of more than 300 rupees not included in the above estimate. The Government meantime placed the remaining volumes of Buchanan in the Editor's hands, with an intimation of its "desire that the printing of these records should be continued." It was therefore with no small feeling of mortification that

* Originally 32 pages only were given in each number, latterly 64.

the EDITOR perused the following letter, announcing that the privilege of free postage should cease from June next, especially after having been honored, on an explanation of the nature of the work, with an extension of the same privilege to the Madras presidency, in addition to that formerly bestowed by the Governors of Bombay and Ceylon.

To JAMES PRINSEP, Esq.

Genl. Dept.

Editor of the Journal of the Asiatic Society,

Sir,

I am directed to inform you, that the Governor General in Council has resolved, that after six months the exemption from postage, which is now enjoyed by the Journal of the Asiatic Society, shall be discontinued.

I have the honor to be,

Sir,

Your most obedient servant,

Council Chamber,

G. A. BUSHBY,

2nd Dec. 1833.

Offg. Sec. to Govt.

It may reasonably be feared that many subscribers at distant stations may be unable to continue their support to the work, when its cost shall be enhanced by postage; but (should it be impossible, on a proper and respectful representation of the circumstances, to avert the imposition of postage) every means will be taken of lessening the burthen by sending the monthly numbers by the bangy instead of the regular dāk.

On the contents of a volume which has already been perused by nearly all to whom it circulates, it would have been obviously needless to make any remark, were it not desirable to prove that the favors hitherto conferred upon the work by the Government of the country had not been altogether misapplied.

Independently of the volume of Dinajpur Statistics, which forms a model for the use of public officers engaged in collecting similar information, the GLEANINGS and the JOURNAL have been the means of bringing to notice many of the mineral resources of our vast Indian Empire, and of leading to fresh discoveries by the announcement of what had already been found: coal may be adduced as an example,—of which twenty or more different localities have been brought to our knowledge through its pages, where only two were before known. Of the native mineral productions, iron, copper, gold, &c. :—Of the native arts and manufactures, salt, nitre, turpentine, dyes, mills, &c. numerous original ac-

counts have been inserted : catalogues of woods, medicinal plants and drugs : experiments on materials, wood, iron, cement ;—Statistical reports ;—descriptions of newly explored countries and people :—in fact, it would be difficult to open a number of the JOURNAL without finding some information which must possess value in the eyes of a government. Contributions of a more exclusively scientific nature have, in the mean time, continued to multiply, and the objects pointed out as desiderata at home in the geography, meteorology, geology, and natural history of this country, are in the course of rapid and systematic elucidation. So numerous for instance have been the registers of the weather offered for publication, that space could only be found for abstracts of many. There has hardly been time for the collection of materials regarding the tides of the Indian coasts, suggested in the Rev. Professor WHEWELL's circular, (inserted in page 151,) but the attention of those who have opportunities of eliciting the information required, is again solicited to this object.

As a proof of the benefit conferred on science by the free and extensive circulation of a periodical devoted to such objects, the Editor feels pride in alluding to the ardour which his plates of ancient coins have inspired in many active collectors, and above all to the reward bestowed on himself by the munificence of General VENTURA, the most successful pursuer of antiquarian research in the Panjáb, who has presented to him all the coins and relics discovered on opening the celebrated Tope of Manikyala. They are now on their way to Calcutta.

That extracts and analyses of European science have not been more frequent must be attributed once more to want of space and want of leisure. The Editor would recommend all who seek for knowledge of the progress of science in Europe to procure a copy of the Reports of the British Association for 1832, in which they will find every branch discussed by the philosopher best able to give it illustration. To attempt to shorten those admirable essays would be mutilation rather than abridgment ; yet unfortunately most of them are too long for the pages of a monthly journal.

On the subject of orthography of native words, the Editor is driven to make one concession, for which he fears the learned Societies at home

will denounce him as an apostate to the system of their leader. Every communication, with hardly any exception, which comes for publication, adopts the Gilchristian mode of spelling, or that modification of it which has been *ordered* to be used in all Government records, surveys, &c. An attempt has been made hitherto to conform the whole to Sir William JONES' method, but necessarily there have been continual omissions, and the contributors in most cases express themselves but ill pleased to see their words transformed into shapes but ill accordant with ordinary *English* pronunciation. The Editor has therefore resolved to adopt the middle course followed in HAMILTON's Hindustan, namely, to print all Indian names and words in the ordinary roman type as they are usually written and pronounced, and to place in italics all such native terms and proper names, as are corrected, and spelt according to the classical standard of Sir William JONES: in many cases the latter may be inserted in brackets after the ordinary word.

Where contributors have occasion to illustrate their papers by plates, it will be a great convenience to the EDITOR to have the original drawings prepared of the same dimensions as the printed page of letter press, to save the trouble and expence of reducing them.

The EDITOR will not allude in this place to the severe loss he has sustained in the death of some of the most able and constant supporters of his work, and the departure to Europe of others in the course of the past year; since he hopes that a more worthy channel will be found for the record of their meritorious labours for the cause of Science in India, in the Proceedings of the Asiatic Society, to which their names belong, and in which their reputation must ever be cherished with fond remembrance.

1st January, 1834.

LIST OF SUBSCRIBERS, 1833.

[The names marked with an asterisk have availed themselves of the privilege of taking the Journal gratis, as members of the Asiatic Society : *d*, after a name, denotes *deceased or discontinued*.]

The Honorable the Court of Directors, (By the Secretary to Government, General Department,) one copy.

*The Right Honourable Lord W. C. BENTINCK, Governor General, &c. one copy.

*The Honorable Sir C. T. METCALFE, Bart. Member of Council, one copy.

*The Honorable Sir E. RYAN, Knt. Chief Justice, one copy.

*The Right Rev. Lord Bishop of Calcutta, one copy.

The Venerable Archdeacon CORRIE, one copy.

Subscribers for twelve copies.

The Physical Class, Asiatic Society.

Subscribers for four copies.

Hyderabad Book Society.

Subscribers for two copies.

P. Andrew, Esq. Calcutta.

Major A. Irvine, Delhi.

J. J. Malvery, Esq. Bombay.

Subscribers for one copy.

Abercrombie, Lieut. W. Hazareebagh.

Agra Book Club.

*Anburey, Col. Sir Thos. Calcutta.

Artillery Book Club, Dum-Dum.

Atherton, H. Esq. Futtugurh.

*Aydall, J. Esq. Calcutta.

Baikie, Dr. Ootacamund.

Baker, Capt. H. C. England.

Baker, Lieut. W. E. Seharanpur.

Ballard, Geo. Esq. Calcutta.

Barlow, J. H. Esq. Bagundec.

Barrett, M. Esq. Calcutta.

Barrow, H. Esq. Ditto.

Batten, J. H. Esq.

Batten, G. M. Esq. Calcutta.

Beatson, Lieut.-Col. W. S. Ditto.

Beckett, J. O. Esq. Coel.

Bedford, Capt. J. Allahabad.

Bell, Dr. H. P. Calcutta.

Bengal Club, Ditto.

Benson, W. H. Esq. England.

*Benson, Major R. Ditto.

Betts, C. Esq.

Bird, W. W. Esq. Calcutta.

Blair, Major J. Bareilly.

Blake, Capt. B. Cuttack.

Blake, H. C. Esq. Dhobah, near Culnah.

Blechynden, A. H. Esq. Calcutta.

Boileau, Lieut. J. T. Agra.

Boileau, Lieut. A. H. E. Ditto.

Bombay Asiatic Society.

Boulderson, H. S. Esq. Seharanpur.

Boulderson, S. M. Esq. Azimgurh.

Boutrons, T. Esq. Purneah.

Bramley, Dr. M. J. Calcutta.

Brander, Dr. J. M. Cuttack.

Bridgman, J. H. Esq. Goruckpore.

Bridgman, Lieut. P. Agra.

*Briggs, Col. J. Nagpore.

Brittridge, Capt. R. B. Bareilly.

Brooke, W. A. Esq. *d*.

Brownlow, C. Esq. Calcutta.

Browne, Capt. W. Seharanpur.

Brown, Lt. E. J. Engineers, Allahabad.

Browne, G. F. Esq. Joynpore.

Bruce, W. Esq. Calcutta.

*Bryant, Col. Sir J. Head Quarters.

*Burke, W. A. Esq. Ditto.

*Burnes, Lieut. A. England.

*Burney, Major H. Ava.

Burt, Lieut. T. S. Allahabad.

Butter, Dr. D. Ghazipur.

Bushby, G. A. Esq. Calcutta.

Byrn, W. Esq. Ditto.

Calcutta Periodical Book Society.

*Calder, J. Esq. Calcutta.

Campbell, Dr. D. Mirzapore.

Campbell, D. A. Esq. Nipal.

Campbell, J. Esq. Cawnpore.

Campbell, Dr. Arch. Moulmayne.

Carey, Rev. Dr. W. Serampore.

Carr, W. Esq. Calcutta.

Carte, Dr. W. E. Hansi.

Casanova, Dr. J. Calcutta.

*Cautley, Lieut. P. T. Seharanpur.

Chambers, R. G. Esq. Surat.

Cheek, Dr. G. N. Bancoorah.

Clarke, Dr. J. Calcutta.

Coignard, E. Esq. Junghipur.

Cole, R. Esq. Madras.

*Colvin, Major J. Delhi.
 Colvin, A. Esq. *d.*
 *Colvin, J. R. Esq. Calcutta.
 Conolly, Lient. E. B. Cawnpore.
 Conoylaul Tagore, Baboo, Calcutta.
 Coombs, Lient.-Col. *d.*
 Cope, Gunner, Meerut.
 Cracroft, W. Esq. Dacca.
 Crawford, W. Esq. Seharanpur.
 Crommelin, Capt. A. Barrackpur.
 *Csoma de Kőrös, Calcutta.
 Cullen, Col. W. Madras.
 Cunningham, Lient. J. D. Rajmahal.
 Cunningham, Lient. A. Berhampur.
 Curtis, J. Esq. Calcutta.

Dalby, Lient. G. M. Calcutta.
 De Courcy, R. Esq. Kishnaghur.
 Delhi Book Society.
 Dennis, Capt. G. G. Meerut.
 Dickens, T. Esq. *d.*
 Dixon, Capt. C. G. Ajmere.
 Dobbs, A. Esq. Calcutta.
 Dorin, J. A. Esq. Ditto.
 Douglas, H. Esq. Patna.
 Drummond, Capt. J. G. Allahabad.
 Dubois, Col. A. Lucknow.
 Duff, Rev. A. Calcutta.
 Dunlop, Lient.-Col. W. Cawnpore.
 Durand, Lient. H. M. Meerut.

Eckford, Dr. J. Nussirabad.
 Edgeworth, M. P. Esq. Umbala.
 Editor Bombay Liter. Gaz.
 Editor Calcutta Courier.
 Editor Calcutta Liter. Gaz.
 Editor Colombo Journal, Ceylon.
 *Egerton, C. C. Esq. Calcutta.
 Eisdale, D. A. Esq. Poona.
 Ellerton, J. F. Esq. *d.*
 Elliot, J. B. Esq. Patna.
 Elliot, W. B. Esq. Bauleah.
 Erskine, D. Esq. Elambazar.
 Evans, Dr. Geo. Calcutta.
 Everest, Rev. R. Delhi.
 *Ewer, W. Esq. Allahabad.

Fagan, Lient. G. H. Cawnpore.
 Fagan, Brig. C. S., C. B., Neemuch.
 Falconer, Dr. H. Seharanpur.
 Fane, W. Esq. Allahabad.
 Ferguson, W. F. Calcutta.
 Fiddes, Col. T. Muttra.
 Fisher, Lient. T. Kachar.
 Fitzgerald, Capt. W. R. Calcutta.
 Forbes, Capt. W. N. Ditto.
 Fraser, H. Esq. (Senr.) Delhi.
 Fraser, A. Esq. Ditto.
 Fraser, C. S. Esq. Saugor.
 Frith, Lient.-Col. W. H. L. Dum Dum.

Garden, Dr. A. Calcutta.
 Gardner, Col. W. L. Lucknow.
 Gerard, Capt. A. Hansi.
 Gerard, Capt. P. Subathu.
 Gerard, Dr. J. Ditto.
 Gilchrist, Dr. W. Vizianagaram.

*Gordon, G. J. Esq. Calcutta.
 Gorton, W. Esq. Benares.
 Governor (His Exc. the) of Ceylon.
 Gowan, Capt. E. P. Calcutta.
 Groeme, H. S. Esq. *d.*
 Graham, J. Esq. Calcutta.
 Grant, J. W. Esq. Hurripaul.
 Grant, Lient. C. E. *d.*
 Grant, Capt. W. Benares.
 Grant, J. Esq. Calcutta.
 Grey, E. Esq. Calcutta.
 Greenlaw, C. B. Esq. Ditto.
 Gubbins, C. Esq. Delhi.

Hall, Lient. J. H. Kalladghee.
 Hamilton, H. C. Esq. Bhagulpur.
 Harding, Ben. Esq. Calcutta.
 *Hare, D. Esq. Ditto.
 Harris, F. Esq. Ditto.
 Hart, Dr. T. B. Saugor.
 Henderson, Dr. J. Agra.
 *Herbert, Capt. J. D. *d.*
 Hodges, Lient. A. Sunderbunds.
 Hodgson, B. H. Esq. Nipal.
 Hodgson, B. Esq. Kishnaghur.
 Holcroft, V. Esq. *d.*
 Homfray, J. Esq. Care of Messrs. Jessop
 and Co.
 Horse Brigade, Artillery, Meerut.
 Howrah Dock Company, Calcutta.
 Howstoun, R. Esq. Backergunge.
 Huddleston, Lient. H. Goruckpur.
 Hunter, R. Esq. Puri.
 Hunter, J. Esq. *d.*
 Hutchinson, Major G. Calcutta.
 Hutchinson, Capt. F. Bombay.
 Hutton, Lient. T. Neemuch.

Inglis, Esq. China.
 India Gaz. Press, Calcutta.
 Inverarity, Lient. J. Engineers, Madras.

Jackson, Dr. A. R. Calcutta.
 Jeffreys, Dr. J. Ditto.
 Jenkins, Capt. F. Ditto.
 Jervis, Capt. Thos. Ootacamund.
 Joues, Capt. N. Cawnpore.
 Jopp, Capt. J. Poona.
 Kali Kissen, Moharaja, Bahadoor.
 Kean, Dr. Arch. Murshedabad.
 Kennedy, Lient. T. Bombay. *d.*
 Kerr, A. J. Esq. Malacca.
 King, Dr. Geo. Patna.
 Kassipersaud Ghosa, Baboo, Calcutta.
 Kyd, J. Esq. Ditto.
 Laidly, J. W. Esq. Beerbhoom.
 Lamb, G. Esq. Dacca.
 Lambert, W. Esq. Allahabad.
 Langstaff, Dr. J. Calcutta.
 Laughton, Dr. R. *d.*
 Law, J. S. Esq. Surat.
 Lindsey, Dr. A. K. Chunar.
 Lindsay, Col. A. Dum Dum.
 Lloyd, Capt. Rich. Calcutta.
 Lockett, Col. A. Ajmere.
 Logan, Geo. Esq. Seharanpur.
 Login, J. S. Esq. Hyderabad.

- Louis, J. Esq. Bouleah. *d.*
 Louis, T. Esq. Moradabad.
 Lowther, W. Esq. *d.*
 Lowther, R. Esq. Allahabad.
 Lushington, G. T. Esq. Bhurtpoor.
 Macdonald, Lieut. R. Sangor.
 Macdowal, W. Esq. Rungpur.
 Macfarlan, D. Esq. Calcutta.
 Macgregor, D. W. L. Loodianah.
 MacCheyne, W. O. H. Esq. Nusseerabad.
 Mackeuzie, Lieut. J. 8th L. I. Cawnpore.
 Macleanan, Dr. J. Bombay.
 Macleod, D. A. Esq. Assam. *d.*
 Macleod, Col. D. Murshedabad.
 *Macnaghten, W. H. Esq. Calcutta.
 Macpherson, Lieut. S. Hyderabad.
 MacRitchie, J. Esq. Bancurah.
 Madras Club.
 Mainwariug, T. Esq. *d.*
 Malcolmson, Dr. I. N. Nagpore.
 Mannuk, M. M. Esq. Calcutta.
 Manson, Capt. J. Bittour.
 Marshall, Capt. G. T. Calcutta.
 Marshman, Rev. Dr. J. Serampore.
 Martin, Lieut. R. Delhi.
 *Martin, J. R. Esq. Calcutta.
 Martin, C. R. Esq. Ditto.
 Martin, W. B. Esq. Indore.
 Master, W. Esq. Calcutta.
 *Mendez, F. Esq. Ditto.
 Mess Library, 11th Light Dragoons.
 Miles, Lt. R. H. Futtyghur.
 *Mill, Rev. Principal Dr. W. H.
 Milner, Captain E. T. Almorah.
 Military Board, Calcutta.
 Military Library Society, Mhow.
 Montgomery, Dr. W. Penang.
 Montrion, Lt. C. Calcutta.
 Moore, Capt. J. A. Hyderabad.
 Morgan, R. W. Esq. Tirhoot.
 Morley, C. Esq. Calcutta.
 Morris, J. C. Esq. for Mad. Lib. Socy.
 Madras.
 Morris, J. C. Esq. Arrah.
 Morse, Major A. Bombay.
 Mouatt, Lt. James A. Kurnal.
 Mouatt, Dr. J. A. Pres. Bangalore B.
 Socy. Bangalore.
 Muller, A. Esq. Calcutta.
 Murray, Capt. H. R. Noacolly.
 Muzzufferpore Book Club, Tirhoot.
 Napier, Lieut. R. J. Seharanpur.
 Nash, Dr. D. W. Hyderabad.
 Nicholson, Capt. M. Jabalpur.
 *Nicholson, S. Esq. Calcutta.
 Nisbet, W. Esq. *d.*
 Noton, B. Esq. Englaud.
 Nussirabad Book Society.
 Officers, 73rd Regt. N. I. Benares.
 ——— H. M. 16th, Chinsurah.
 ——— 40th Regt. N. I. Allyghur.
 ——— 12th Regt. N. I. Lucknow.
 Oliver, Major T. Nussirabad.
 Oliver, Hon'ble W. Madras.
 Ommaney, Lieut. E. L. Dacca.
 Ommaney, M. C. Esq. Saugor.
 Ostell, T. Esq. Calcutta.
 Pakenham, T. Esq. Calcutta.
 Parental Ac. Institution, Ditto.
 Parker, H. M. Esq. Ditto.
 Patrick, W. Esq. Fort Gloster.
 Patton, Capt. J. W. *d.*
 *Pearson, Dr. J. T. Calcutta.
 *Pemberton, Capt. R. B. on Survey.
 Persidh Narair Sing, Baboo, Benares.
 Piddington, H. Esq. Chouadinga Fac-
 tory.
 Pigg, T. Esq. Calcutta.
 Playfair, Dr. Geo. Meerut.
 Plumb, J. R. Esq. Calcutta.
 Poole, Col. E. Ditto.
 Pratt, Geo. Esq. Purneah.
 Presgrave, Major D. Saugor.
 *Prinsep, H. T. Esq. Calcutta.
 Prinsep, Miss, England.
 *Prinsep, C. R. Esq. Ditto.
 *Procter, Rev. T. Ditto.
 Proprietors of the John Bull, Ditto.
 Pyle, J. C. Esq. Futtyghur.
 *Radhacaunt Deb, Baboo, Calcutta.
 *Raincomul Sen, Baboo, Ditto.
 Ramsay, Capt. W. H. Head Quarters.
 Ranken, Dr. J. Delhi.
 Rattray, R. H. Esq.
 *Ravenshaw, E. C. Esq.
 Renny, Lieut. T. Agra.
 Renney, D. C. Muttra.
 Rhodes, D. W. Sylhet.
 *Richy, Monsr. A. L. Calcutta.
 Roberts, Major A. Ditto.
 Robertson, T. C. Esq. Sylhet.
 *Robison, C. K. Esq. Calcutta.
 Rogers, Esq. Ditto.
 Ross, A. Esq. Ditto.
 *Ross, D. Esq. Ditto.
 Ross, Capt. D. Gwalior.
 Routh, W de H. Esq. Boolundshuhr.
 Row, Dr. J. Bandah.
 Royle, Dr. J. England.
 Ruspini, Rev. W. Dinapur.
 *Sage, Capt. W. Dinapur.
 Sale, Lieut. T. H. Delhi.
 Sanders, Capt. E. Cawnpur.
 Sandy, T. E. Esq. Arrah.
 Sandys, Rev. T. Calcutta.
 Satchwell, Capt. J. Dinapur.
 Saunders, Geo. Esq. Calcutta.
 Saunders, J. O. B. Esq. Coel.
 Scott, D. Esq. Burdwan.
 Seaton, Lieut. T. Jamalpur.
 Sevestre, Robt. Esq. Calcutta.
 Shaw, T. A. Esq. Chittagong.
 Shore, Hon'ble F. J. Futtyghur.
 Shortreed, Lieut. R. Poona.
 Siddons, Lieut. H. Berhampore.
 Simmonds, Capt. J. H. *d.*
 Sleeman, Capt. W. H. Jabalpur.
 Sloane, W. Esq. Tirhoot.
 Smith, T. P. Esq. Baitool.

- Smith, Samuel and Co. Calcutta.
 Smith, Capt. E. Ditto.
 Smith, Lieut. J. T. Musulipatam.
 Smyth, Capt. W. H. Calcutta.
 Smyttan, Dr. Geo. Bombay.
 Society Nat. His. Mauritius.
 Southby, Capt. F. S. Calcutta.
 Sparks, Capt. J. P. Ghazipur.
 Speed, D. W. H. Esq. Calcutta.
 Spiers, A. Esq. Allahabad.
 Spilsbury, Dr. G. G. Jabalpur.
 Spry, Dr. H. H. Saugor.
 Stacy, Lieut.-Col. L. R. Nussirabad.
 Staey, S. P. Esq. Calcutta.
 Stainforth, F. Esq. Goruckpur.
 Stephenson, J. Esq. Patna.
 Stevenson, Dr. W. Jun. Calcutta.
 *Stirling, E. Esq. Allyghur.
 Strokes, Dr. J. Hamirpur.
 *Strong, F. P. Esq. Calcutta.
 Sutherland, Capt. E. Calcutta.
 Sutherland, Hon'ble J. Bombay.
 Sweetenham, H. Esq. Futtighur.
 Swiney, Dr. J. Kurnal.
 *Swinton, G. Esq. England.
 Sylhet Book Club.

 Tanner, Capt. W. F. H. Monghyr.
 Taylor, T. G. Esq. H. C. Astronomer,
 Madras.
 Tayler, J. Esq. Dacca.
 Telfair, C. Esq. Mauritius *d.*
 Terraneau, Capt. W. H. Sylhet.
 Thomas, C. Esq. Singapore.
 Thomas, Dr. W. Barrackpur.
 Thomas, E. F. Esq. Kemaon.
 *Thomason, J. Esq. Azimgurh.
 Thompson, Capt. G. Hazareebagh.
 Thompson, Capt. J. Calcutta.
 Thoresby, Capt. C. Berhampur.
 Tickell, Col. R. Barrackpoor.

 Tierney, M. J. Esq. *d.*
 Trade Association, Calcutta.
 Trail, G. W. Esq. Kemaon.
 Tremenhert, Lieut. G. B. Delhi.
 *Trevclyan, C. E. Esq. Calcutta.
 *Trotter, R. Esq. Gyah.
 *Troyer, Capt. A. Calcutta.
 Turner, T. J. Esq. Seharanpur.
 Twemlow, Capt. G. Arungabad.
 *Twining, W. Esq. Calcutta.
 *Tytler, J. Esq. Ditto.

 Udny, C. G. Esq. Calcutta.

 Vicary, Lieut. N. Meerut.

 *Wade, Capt. C. M. Loodianah.
 Walters, H. Esq. Chittagong.
 *Wallich, N. Esq. Calcutta.
 Warner, Capt. J. H. Bauleah.
 *Watson, Col. T. C. Dacca.
 Watt, A. Esq. Singapur.
 Waugh, Lieut. A. H. Agra.
 Webb, L. W. Esq. Surat.
 Wells, F. O. Esq. Monghyr.
 Western, Lieut. J. R. Midnapur.
 White, Rev. E. Cawnpore.
 Wilcox, Capt. R. Gt. Trig. Surv.
 Wilkinson, W. Esq. Pooree.
 Wilkinson, J. E. Esq. *d.*
 Winfield, Capt. J. S. Bhopal.
 *Wilson, H. H. Esq. England.
 Wise, Dr. T. A. Hoogly.
 Wise, J. P. Esq. Dacca.
 *Withers, Rev. G. N. Calcutta.
 Wood, Dr. Arthur, Simlah.
 Woodburn, Dr. D. Shirghati.
 Woollaston, M. W. Esq. Calcutta.

 Zeigler, L. Esq. Setapur.

CONTENTS.

No. 13.—JANUARY.

	<i>Page.</i>
I.—Continuation of the Route of Lieut. A. Burnes and Dr. Gerard, from Pesháwar to Bokhára.	1
II.—On the Manufacture of Saltpetre, as practised by the Natives of Tirhút. By Mr. J. Stevenson, Supt. H. C.'s Saltpetre Factories in Behar.	23
III.—On the Greek Coins in the Cabinet of the Asiatic Society. By James Prinsep, Secretary.	27
IV.—Eclipses of Jupiter's Satellites...	41
V.—A method of preparing Strychnia. By J. T. Pearson, Esq. Assistant Surgeon.	42
VI.—Proceedings of the Asiatic Society.	43
VII.—Miscellaneous.	
1.—Hot-spring at Pachete. By C. Betts, Esq...	46
2.—Extraordinary Banyan Tree at Kulow Nagty Hally, near Bhuoma Naik Droog, in the territory of Mysore...	47
3.—Discovery of the Silhet Coal Mines...	<i>ib.</i>
4.—Questions proposed by the Burmese Heir Apparent.	<i>ib.</i>
VIII.—Progress of Astronomical Science.	48
IX.—Meteorological Register.	56

No. 14.—FEBRUARY.

I.—Note on the Origin of the Kala-Chakra and Adi-Buddha Systems. By Mr. Alexander Csoma de Kőrös...	57
II.—Journal of a March from Ava to Kendat, on the Khycndwen River, performed in 1831, by D. Richardson, Esq. Assistant Surgeon of the Madras Establishment, under the orders of Major H. Burney, the Resident at Ava.	59
III.—Trisection of an Angle. By Lieut. Nasmyth Morrieson, W. S.	71
IV.—Short Description of the Mines of Precious Stones, in the District of Kyatpyen, in the Kingdom of Ava.	75
V.—Note on Saline Deposits in Hydrabad. By Assistant Surgeon J. Malcolmson, Madras European Regiment.	77
VI.—An Experimental Inquiry into the Means employed by the Natives of Bengal for making Ice. By T. A. Wise, Esq. M. D.	80
VII.—Proceedings of the Asiatic Society...	91
VIII.—Systematically arranged Catalogue of the Mammalia and Birds belonging to the Museum of the Asiatic Society, Calcutta. By Dr. W. Warlow.	96
IX.—European Notices of Indian Natural History.	
1.—The Dugong.	100
2.—Nipal Specimens.	101
X.—Meteorological Table for February.	104

No. 15.—MARCH.

I.—On the Restoration of the Ancient Canals in the Delhi Territory. By Major Colvin, Engineers...	105
II.—Abstracts of Observations of the Temperature, Pressure, and Hygrometrical State of the Air at Nasirabad. By Major T. Oliver...	128
III.—Determination of the Constant of Expansion of the Standard 10-feet Iron Bar of the great Trigonometrical Survey of India; and Expansions of Gold, Silver, and Copper by the same Apparatus. By James Prinsep...	130
IV.—Continuation of Dr. Gerard's Route with Lieut. Burnes, from Bokhára to Meshid...	143
V.—Proceedings of the Asiatic Society.	149
Whewell's Desiderata on the subject of Tides...	151
VI.—Madras Literary Society.	154
VII.—Miscellaneous.	
1.—Indian Botany...	156
2.—Indian Geology.	157
3.—Indian Arts and Manufactures.	158
4.—Note on Lieut. Burt's Instrument for trisecting Angles.	159
VIII.—Meteorological Register for March.	160

No. 16.—APRIL.

I.—Account of the Jain Temples on Mount Abú in Guzerát. By Lieut. Burnes, Bombay Army...	161
II.—List of Indian Woods collected by N. Wallich, M. D., F. R. S., Corresponding Member of the Royal Institute of France, and the Academy of Sciences at Berlin, &c. and of the Society of Arts of London; Superintendent of the Botanic Garden at Calcutta...	167
III.—Table for Ascertaining the Heights of Mountains from the boiling point of Water. By James Prinsep, Sec., &c...	194
IV.—Translation of a Tibetan Passport, dated A. D. 1688. By M. Alex. Csoma de Kőrös.	201
V.—Proceedings of the Asiatic Society.	203
VI.—Miscellaneous.	
1.—Indian Meteorology.	206
2.—Indian Arts and Manufactures.	209
3.—Phenomenon of the Japanese Mirror.	214
VII.—Meteorological Register for April.	216

No. 17.—MAY.

I.—Origin and Classification of the Military Tribes of Nipal. By B. H. Hodgson, Esq...	217
II.—Description of Bokhára. By Lieut. A. Burnes, Bombay Army, Assistant Resident at Kutch.	224
III.—On the Climate of Nagpúr. By W. Geddes, Surgeon, Mad. Eur. Reg...	239
IV.—Table shewing the Rise of Spring Tides in Bombay Harbour, during night and day, for the year 1832, communicated by Ben. Noton, Esq...	247
V.—On the Native Manufacture of Turpentine.	248
VI.—Description of a Sun Dial in the Court of the Moti Masjid, in the Fort of Agra. By Capt. J. T. Boileau, Engineers...	251
VII.—Catalogue of the most remarkable Celestial Objects visible in the Horizon of Calcutta, arranged in order of Right Ascension...	252
VIII.—Description of a Compensation Barometer, and Observations on Wet Barometers. By J. Prinsep, Sec., &c...	258

	<i>Page.</i>
IX.—Proceedings of the Asiatic Society.	262
X.—Miscellaneous.	
1.—Rustic Bridge.	267
2.—Remarks on the Paper on the Trisection of an Angle in No. 14. of the “Journal of the Asiatic Society.”.	268
3.—New Patent Improved Piano-Forte.	269
4.—Specific Gravity of Metallic Alloys.	270
5.—Proportion of Recent and Fossil Shells.	<i>ib.</i>
6.—Table of the Lengths in British Miles of the Degrees of Latitude and Longitude from 0° to 30°, with the Areas bounded by them in Square Miles.	271
XI.—Meteorological Register for May.	272

No. 18.—JUNE.

I.—On the Marriage Rites and Usages of the Játs of Bharatpúr. By G. T. Lushington, C. S.	273
II.—Report on the Geology of Hyderabad. By H. H. Voysey, Esq. Surgeon and Geologist to the Great Trigonometrical Survey of India, 1819.	298
III.—On the reputed Descendants of Alexander the Great, in the Valley of the Oxus. By Lieut. Alexander Burnes, Bombay Army.	305
IV.—On the “Topes” and Grecian Remains in Panjáb. By Lieut. Burnes, Bom- bay Army.	308
V.—Note on Lieutenant Burnes’ Collection of Ancient Coins. By James Prinsep, Sec., &c.	310
VI.—Astronomical Observations at Bareilly. By H. S. Boulderson, Esq.	318
VII.—Notice of a Native Sulphate of Alumina from the Aluminous Rocks of Nipal. By J. Stevenson, Superintendent H. C. Saltpetre Factories in Behar.	321
VIII.—Notice of a Native Sulphate of Iron from the Hills of Behar, and used by Native Dyers of Patna. By Ditto.	321
IX.—Notice of Analysis of the Ashes of four Indian Plants. By Ditto.	322
X.—Proceedings of the Asiatic Society.	323
XI.—Miscellaneous.	
Synopsis of the Winds, Weather, Currents, &c, between Bombay and Suez, throughout the Year. By Capt. J. P. Sanders, Bombay.	325
XII.—Meteorological Register for June.	328

No. 19.—JULY.

I.—The Birth of Umá—a Legend of Himaláya—by Cálidása.	329
II.—Description of the Pan-chaki or Native Water-mill.	359
III.—Description of the Salt Works at Panchpadder, Mewár. By Lieut. A. Burnes, Bombay Army.	365
IV.—Proceedings of the Asiatic Society.	367
V.—Report of the Committee appointed on the 27th March, 1833, to consider on the expediency of recommending to the Government the continuance of the Boring Experiment.	369
VI.—Miscellaneous.	
1.—Remarks on Hutton’s Mathematics.	374
2.—The Royal Society.	375
3.—Discovery of a Bed of Fossil (Marine?) Shells on the Table Land of Central India.	376
4.—Indian Zoology.	377
VII.—Analysis of Books.—Taylor’s Astronomical Observation at Madras.	380

	<i>Page.</i>
VIII.—Meteorological Table kept at Bancoora, for the year 1832, by John Mac-Ritchie, Esq.	383
IX.—Meteorological Register for July.	384

No. 20.—AUGUST.

I.—Origin of the Shákya race, translated from the \mathcal{Q} (<i>La</i>), or the 26th, volume of the <i>mDo</i> class in the <i>Ká-gyur</i> , commencing on the 161st leaf. By M. Alex. Csoma de Kőrös,	385
II.—Second Report on the Geology of Hyderabad. By H. W. Voysey, Esq. Surgeon and Geologist to the Trigonometrical Survey of India, dated Secanderabad, the 28th June, 1820.	392
III.—Bactrian and Indo-Scythic Coins—continued. By James Prinsep, F. R. S. Sec. As. Soc.	405
IV.—Note on the Zoology of the 2nd Part of the Transactions of the Physical Class of the Asiatic Society of Bengal,	417
V.—Note on the extraordinary Fall of the Barometer during the Gale of the 21st May last. By James Prinsep, Sec. &c.,	427
VI.—Climate of Singapur,	428
VII.—Culminating stars observed with the Moon at Násirabád. By Lieut.-Col. Thomas Oliver, &c.,	432
VIII.—Chemical Analyses. By James Prinsep, Sec. &c.,	434
IX.—Earthquake,	438
X.—Meteorological Register, for August,	440

No. 21.—SEPTEMBER.

I.—An Inquiry into the Laws governing the two great powers, Attraction and Repulsion, as operating on the Aggregation and Combination of Atoms. By Julius Jeffreys, Esq. Bengal Medical Service,	441
II.—On Progressive Development in the cold-blooded Vertebrata. By D. W. Nash, Asst. Surgeon, Beng. Est. A. L. S. Corresp. Member S. A.,	465
III.—Some Geological remarks made in the country between Mirzapúr and Ságár, and from Ságár northwards to the Jamna. By the Rev. R. Everest, F. G. S. &c.,	475
IV.—On the Notice of Alum or Salájit of Nipal. By A. Campbell, Assistant Surgeon, &c.,	482
V.—Defence of Lt. Burt's Trisection Instrument,	485
VI.—Computation of the Area of the Kingdoms and Principalities of India,	488
VII.—Miscellaneous.	
1.—Importation of Ice from Boston,	491
2.—On the Action of various Lights upon the Retina. By Sir D. Brewster,	494
3.—Substances contained in Opium,	495
3.—Death of Captain J. D. Herbert,	ib.
VIII.—Meteorological Register for August,	496

No. 22.—OCTOBER.

I.—A visit to the Gold Mine at Batting Moring, and Summit of Mount Ophir, or "Gunong Ledang," in the Malay Peninsula. By Lieut. J. T. Newbold, 23rd Regt. Mad. L. Inf.	497
II.—On the Nest of the Tailor Bird. By Lieut. T. Hutton, 37th Regt. N. I.	502
III.—An Inquiry into the Laws governing the two great powers, Attraction and Repulsion, as operating in the Aggregation and Combination of Atoms. By Julius Jeffreys, Esq. Bengal Med. Est.	506

	<i>Page.</i>
IV.—Iron Suspension Bridge over the Beosi River, near Sagar, Central India.	
Pl. XVI. 	538
V.—Additional Note on the Climate of Nagpúr. By J. Prinsep, Sec. As.	
Soc. &c., 	542
VI.—Proceedings of the Asiatic Society, 	546
VII.—Analysis of Books, 	551
VIII.—Miscellaneous.	

1.—Circular Instructions from the Geological Society, for the Collection of Geological Specimens, 	557
2.—Mirrors of Fusible Alloy, 	559
3.—Liverpool and Manchester Railway, 	<i>ib.</i>
IX.—Meteorological Register for September, 	560

No. 23.—NOVEMBER.

I.—On the Colossal Idols of Bamián. By Lieut. Alexander Burnes, Bombay Army, 	561
II.—Account of the Earthquake at Kathmandú. By A Campbell, Esq. Assistant Surgeon, attached to the Residency, 	564
III.—Census of the Population of the City and District of Murshedabad, taken in 1829, 	567
IV.—List of Birds collected in the Jungles of Borabhúm and Dholbhúm. By Lieut. S. R. Tickell, 31st Regt. N. I., 	569
V.—Note on the Fossil Bones discovered near Jabalpúr. By J. Prinsep, Sec. As. Soc. 	583
VI.—Report on a Collection of Objects of Natural History. By the Curator of the Museum of the Asiatic Society, 	588
VII.—Note on the Genus Spiraculum. By J. T. Pearson, Curator As. Soc. 	590
VIII.—On the Kukumb ka Tel, or concrete Oil of the Wild Mangosteen, 	592
IX.—Note on the Coal discovered at Khyúk Phýú, in the Arracan District, 	595
X.—Analysis of Books.—Transactions of the Batavian Society, 	597
XI.—Miscellaneous.	
1.—Register of the Temperature of Ghazipúr. By the Rev. R. Everest, 	604
2.—Note on the Salájit of Nipal, 	605
3.—Summary Sketch of the Geology of India, 	606
XII.—Meteorological Register for Nov. 1833, 	608

No. 24.—DECEMBER.

I.—A short Account of the Charak Púja Ceremonies, and Description of the Implements used. By Ram Comul Sén, Native Secretary, Asiatic Society. 	609
II.—Specimens of some Ornamental Forms of Persian Writing. By Mahá Rájá Káli Kishen Behadúr, of Calcutta, 	613
III.—Description of an Indian Balance, called Tula. By the same, 	615
IV.—Abstract of a Meteorological Journal, kept at Kotgarh, (Lat. 31° 11' 45" N. Long. 77° 27' 49" E.) Subathú, and the intermediate places in the Himálaya mountains for 1819-20. By Captain Patrick Gerard, 9th Regt. B. N. I. 	615
V.—Notes on the Specimens of the Kankar Formation, and on Fossil Bones collected on the Jamna. By Captain E. Smith, Bengal Engineers, 	622
VI.—Further particulars of the Earthquake in Nipal. By A. Campbell, Esq. Assistant Surgeon, attached to the Residency, 	636
VII.—Note on the Fossil Palms and Shells lately discovered on the Table-land of Sagar in Central India. By H. H. Spry, Esq. Bengal Medical Service, 	639
VIII.—Meteorological Register at Bareilly in 1831. By H. S. Boulderson, Esq. 	641

	<i>Page.</i>
IX.—Proceedings of the Asiatic Society,	645
X.—Miscellaneous.	
1.—Note on the Tailor Bird's Nest. By Lieut. Gifford.	648
2.—Note on the Inscription on the Hindu Coins. (Plate VIII. Fig. 15.) ..	649
3.—Radiation in Valleys.	<i>ib.</i>
4.—Bones in the Delta Alluvium.	<i>ib.</i>
5.—Fall of Fish from the Sky.	650
6.—Fossil Shells near Herat.	652
7.—Cochineal.	<i>ib.</i>
8.—Reply to the Questions of the Burmese Philosopher Prince, ..	653
9.—Cave of Secanderiah, near Tabriz.	658
XI.—Meteorological Register for December, 1833.	660

JOURNAL

OF

THE ASIATIC SOCIETY.

No. 23.—November, 1833.

I.—On the Colossal Idols of *Bamián*. By Lieut. Alexander Burnes, Bombay Army.

ON the 23rd, we reached *Bamián*, which is celebrated for its idols and excavations. These caves are to be seen in all parts of the valley for about eight miles, and they still form the residence of the greater part of the population. They are called "*Sámach*" by the people. A detached hill in the middle of the valley is quite honey-combed with them, and brings to our recollection the Troglodytes of ALEXANDER'S historians: it is called the city of *Ghulghula*, and consists of a continued succession of caves in every direction, which are said to have been the work of a king named *Julál*. The hill of *Bamián* is formed of hardened clay and pebbles, which renders its excavation a matter of little difficulty, but the great extent to which this has been carried excites attention. Caves are found on both sides of the valley, but the greater number are on the northern side, where we found the idols: altogether they form an immense city. Labourers are frequently hired to dig in the ruins, and their labours are rewarded by rings, reliques, coins, &c. They generally bear Cufic inscriptions, and are of a later date than the age of MUHAMMED. These excavated caves or houses have no pretensions to architectural ornament, being no more than squared holes in the hill: some of them are finished in the shape of a dome, and have a carved frieze below the point from which the cupola springs. The inhabitants tell many remarkable tales of the caves of *Bamián*, one in particular, that a mother lost her child among them, and recovered it after a lapse of 12 years! The tale need not be believed, but it will convey an idea of the extent of the works. There are excavations on all sides of the idols, and in the larger one half a regiment might find quarters.

Bamián is subject to *Cábul*, and would appear to be a place of high antiquity; it is perhaps the city which ALEXANDER founded at the base of Paropamisus before entering Bactria. The country indeed from *Cábul* to *Balkh* is yet styled '*Bakhtar-zamín*,' or the *Bakhtar* country. The name of *Bamián* is said to be derived from its elevation, '*Bám*,' signifying balcony, and the affix '*ian*,' country. It may be so called from the caves rising over one another in the rock.

There are no reliques of Asiatic antiquity which have more roused the curiosity of the learned than the colossal idols of *Bamián*. It is fortunately in my power to present a drawing of these images. They consist of two figures, a male and a female; the one named SALSAL, the other SHAH MAMA. The figures are cut in alto relievo in the face of the hill, and represent two colossal images. The male is the largest of the two, and about 120 feet high. It occupies a front of 70 feet, and the niche in which it is excavated extends about that depth into the hill. This idol is mutilated, both legs having been fractured by cannon, and the countenance above the mouth is destroyed. The lips are very large, the ears long and pendent, and there appears to have been a tiara on the head. The figure is covered by a mantle, which hangs over it in all parts, and seems to have been formed of a kind of plaster, and the image has been studded in various places with wooden pins to assist in fixing it. The figure itself is without symmetry, and there is no elegance in the drapery. The hands which held out the mantle have been both broken.

The female figure is more perfect than the male, and has been dressed in the same manner. It is cut out of the same hill, at the distance of 200 yards, but is not half the size. One could not discover that her ladyship was not a brother or a son of the twin colossus, but for the information of the natives. The drawing which is attached will convey better notions of these idols than a more elaborate description. The square and arched apertures which appear in the plate represent the entrance of the different caves or excavations, and through these there is a road which leads up to the summit of both the images. In the lower caves the caravans to and from *Cábul* generally halt, and the upper ones are used as granaries by the community.

I have now to note the most remarkable curiosity in the idols of *Bamián*. The niches of both have been at one time plastered and ornamented with paintings of human figures, which have now disappeared from all parts but that immediately over the heads of the idols. Here the colours are as vivid and the paintings as distinct as in the Egyp-

tian tombs. There is little variety in the design of these figures, which represent the bust of a woman with a knot of hair on the head and a plaid half over the breast, the whole surrounded by a halo, and the head again by another halo. In one part I could trace a group of three female figures following each other. The execution of the work is bad, and by no means superior to the pictures which the Chinese make in imitation of an European artist.

The traditions of the people regarding the idols of *Bamián* are vague and unsatisfactory. It is stated that they were excavated about the Christian era by a tribe of kaffirs (infidels), to represent a king named SALSAL and his wife, who ruled in a distant country, and was worshipped for his greatness. The Hindús assert them to have been excavated by the Pandús, and that they are mentioned in the great epic poem of the *Mahábhárat*. Certain it is that the Hindús on passing these idols at this day hold up their hands in adoration, though they do not make offerings, which may have fallen into disuse since the rise of Islam. I am aware that a conjecture attributes these images to the Buddhists, and the long ears of the great figure make it probable enough. I do not trace any resemblance to the colossal figures in the caves of Salsette near Bombay, but the shape of the head is not unlike that of the great trifaced idol of Elephanta. At *Manikeala*, in the *Panjáb*, near the celebrated '*Tope*,' I found a glass or cornelian antique which exactly resembles this head. In the paintings over the idols I discover a close resemblance to the images of the Jain temples in Western India, in mount *Abú*, and at *Girvan* and *Palitana* in *Katywar*. I judge the figures to be female, but they are very rude, though the colours in which they are sketched are bright and beautiful. There is nothing in the images of *Bamián* to evince any great advancement in the arts, or what the most common people might not have executed with success. They cannot certainly be referred to the Greek invasion, nor are they mentioned by any of the historians of ALEXANDER'S expedition. I find in the history of TIMOURLANE, that both the idols and excavations of *Bamián* are mentioned by SHERIF UD DIN, his historian. The idols are described to be so high that none of the archers could strike the head. They are called LAB and MANAB, two celebrated idols which are mentioned in the Koran; and the writer also alludes to the road which led up to them from the interior of the hill. There are no inscriptions at *Bamián* to guide us in their history, and the whole of the later traditions are so mixed up with ALI, the son-in-law of MUHAMMED, who we well know never came into this part of Asia, that they are most unsatisfactory. It is by no

means improbable that we owe the idols of *Bamián* to the caprice of some person of rank, who resided in this cave-digging neighbourhood, and sought for an immortality in the colossal images which we have now described.

II.—*Account of the Earthquake at Kathmandú.* By A. Campbell, Esq.
Assistant Surgeon, attached to the Residency.

On the 26th of August last, about 6 o'clock p. m. a smart shock of earthquake was experienced throughout the valley, and the neighbouring hills, westward in the valley of *Nayakot* and *Dúny Byas*; eastward at *Panoutí*, *Baneppa*, *Dulkele*, and *Pholam Chók*; and southward at *Chitlong*, *Chisagarhy*, *Etounda*, and *Bissoulea*. The shock was preceded by a rumbling noise from the eastward. The motion of the earth was undulatory, as of a large raft floating on the ocean, and the direction of the swell was from north-east towards south-west. The shock lasted about 1 minute. At 10-45* p. m. of the same day another shock of equal duration and of the same character occurred, and at 10-58, a third and most violent one commenced: at first it was a gentle motion of the earth, accompanied by a slight rumbling noise; soon however it increased to a fearful degree, the earth heaved as a ship at sea, the trees waved from their roots, and houses moved to and fro far from the perpendicular. Horses and other cattle, terrified, broke from their stalls, and it was difficult to walk without staggering as a landsman does on ship-board. This shock lasted for about three minutes in its fullest force. And the following is as correct an estimate as can be ascertained (without official documents) of the damage done by it to life and property throughout the great valley and neighbouring districts of Nipal. It is believed that the two first shocks were harmless†.

* Not by chronometer, but by a good-going clock, which stopped during the great shock. Its pendulum vibrated north and south. [If the clock was set by the sun, the shock must have been 51 m. earlier than in Calcutta.—ED.]

† Doctor Campbell's subsequent letters inform us, that there have been frequent shocks of less violence since the above, many of which (on the 4th and 18th Oct. particularly) were felt at Calcutta, Monghyr, Chittagong, Allahabad, and Jabalpur, nearly simultaneously. On the 26th Oct. he writes, "At 10h. 45m. a. m. a sharp shock of the dangerous or undulating kind occurred. The embassy has returned from China, and I am informed that the great shock was not felt at Lassa, so that it would appear to have been confined to India within the Himálaya."—ED.

Number of Lives lost and Buildings destroyed.

Places.	Killed.	Wounded.	Houses.	Temples and other Buildings.
British Residency grounds,	none	none	1	none.
City of Kathmandú,	60	38	400	Two pillars, built by the minister, each upwards of 100 feet high: the large Temple of Jagarnáth, built by Rán Bahadur, after seven
<i>South of Capital.</i>				
Patan,	6	25	285	years labour, and about a dozen temples, de-
Sano gaon,	none	0	40	stroyed. The modern-built garden houses of
Harra Siddhi,	0	0	20	several members of the minister's family have
Teshu gaon,	0	0	25	been rendered untenable; one of them, a
Selli gaon,	0	0	16	handsome and ornamental edifice, has come to
Pagah,	0	0	24	the ground.
Kúknah,	1	0	130	
Baghmatí,	0	0	80	A crack in the ground of 20 feet in length
Phurphing,	0	0	8	was observed at this village on the morning
Chappa gaon,	0	0	35	of the 27th; the entire number of houses in it
Peang,	0	0	8	was 206, more than a third of the whole were
Taibú,	0	0	18	destroyed, and about 100 men have been much
Bara gaon,	0	0	35	damaged. The injury sustained here is pro-
Balí,	0	0	3	portionally greater than in any other part not
Pahon,	0	0	3	to the east of Kathmandú.
Sasanelly,	0	0	2	
Lúbú,	0	0	25	
Sana,	0	0	7	
Hills about Sasanel- ly,	0	0	20	
<i>East of Kathmandú in the valley.</i>				
Deo Patan,	3	0	30	At the eastern extremity of Deo Patan is
Handi gaon,	0	0	20	the Temple of Paspatnáth, containing Pus-
Nág Dēsa,	4	0	20	puti Jee, the patron deity of the Brahminical
Bareh*,	5	0	20	inhabitants of Nipal. The building escaped
Temí,	0	0	150	unhurt to the great joy of the rulers and
Gou Karan,	0	0	8	people of the land, who attribute the cir-
				cumstance solely to the interference of the
				blind goddess, in behalf of their favourite
				god, rather than to the stout deposition of
				brick and mortar.
Changu,	0	0	20	A fine old temple destroyed.
Sankhú,	20	5	45	A handsome Temple of Mahadeo, situated
				on a hill above Sankhú, is reduced nearly to
				ruins.
Bhat gaon,	200	104	2000	The total number of houses in Bhat gaon is
				reckoned by Mr. HODGSON at 4,700, $\frac{3}{4}$ th of
<i>East of Kathmandú beyond the valley, but in the immediate neighbourhood.</i>				the town is said to be destroyed, 2,000 is the
Sangu,	2	0	8	average of many accounts, six or eight fine
Baneppa,	10	0	20	temples destroyed, and a statue of Rajah RAN-
Nala gaon,	6	0	11	JIT MALL, one of the Newar Princes of the
Panoutí,	18	0	19	Bhat gaon division of the valley.
Dulkele,	10	0	21	Six persons were killed under the ruins of
				one house in this village, their remains were
				found where they had gone to sleep.
Phulam Chok,	60	0	300	A fine temple destroyed here.

* One woman became *Sattí* at this village, her husband having been killed.

Places.	Killed.	Wounded.	Houses.	Temples and other Buildings.
<i>North-east of the valley and more remote.</i>				
Dhulaka,	0	0	0	In this direction the earthquake was much more severely felt. Kúti, a town on the Bhote frontier, on the road to Lassa, is said to have been nearly all destroyed, it contained about 600 houses ; 50 of which only remain. At Listi gaon, also on the Bhote frontier, a large portion of a hill came down, and an iron bridge was destroyed.
Mundun Pahar,				
Kan Sing Chok,				
Kassa,				
Kuti,				
Listi gaon,				
Shipa—the country residence of Colonel Runbír Sinh, 20 miles from Kathmandú on the Lassa road, by the Kuti Pass, is seriously injured. Many small houses attached were destroyed and several lives lost.				At Kan Sing Choke, in the same direction, vulgar report says, that for five days before the earthquake took place, noises similar to the firing of cannons were heard as if under ground; and in this neighbourhood the high road to Lassa is said to be in many places blocked up by the fallen earth from the mountains.
<i>West of Kathmandú.</i>				
Swambunáth,	0	0	3	One small temple destroyed, and the large one a little injured. The form of the large one must have preserved it. It is the chief Buddhist Temple in the valley, built in the fashion of that religion—an immense circular mound of brick work, surmounted by a 4-sided spire or jweet.
Hál Chok,	0	0	3	
Narod Deví,	0	0	1	
Changu Naráyan, . . .	0	0	2	
<i>Goorkha Cantonment or Campoo,</i>				The house of a Captain much injured here.
Kirtipur,	0	0	14	Contains 532 houses, and is built along the ridge and brow of a hill 300 feet higher than the surrounding part of the valley. Its tenements are old and frail. To account for its escape, the inhabitants say, "That some nights previous to the earthquake, and on the memorable night itself, a large tiger or leopard paraded several streets of the town, without molesting any of the inhabitants. This forbearance was reciprocal, for the "guardian angel" was allowed to continue his protecting visits: the admiring crowd, firm in the belief of correct vision, hailed him as RAMJÍ, another incarnation of the "great preserver."
Thankote,	0	0	23	
<i>West of the valley.</i>				
Duny Byas and neighbouring hills,	10	0	40	ous to the earthquake, and on the memorable night itself, a large tiger or leopard paraded several streets of the town, without molesting any of the inhabitants. This forbearance was reciprocal, for the "guardian angel" was allowed to continue his protecting visits: the admiring crowd, firm in the belief of correct vision, hailed him as RAMJÍ, another incarnation of the "great preserver."
Tewanpur,	0	0	10	
Nayakoth,	0	0	3	
<i>North of Kathmandú</i>				
Dharmtulí,	0	0	2	allowed to continue his protecting visits: the admiring crowd, firm in the belief of correct vision, hailed him as RAMJÍ, another incarnation of the "great preserver."
Hukm gaon,	0	0	1	
Toka goan,	0	0	15	
Burha Níl Kanth, . . .	0	0	2	
Chapaly,	0	0	7	
Dharmpur,	0	0	20	
<i>South of the valley.</i>				
Chitlong,	0	0	14	The fort here much injured : a large portion of the breastwork facing the south has fallen, and the wall in many other places, although not fallen, is seriously injured.
Chisagarhy,	0	0	0	
Mukwánpur,	0	0	0	The fort here has also suffered, but in a much less degree than the one at Chisapany.
Total,	414	172	4040	

The above shews that the earthquake was much more severe to the north and east of the valley than here; and that even within the valley it was much more violent to the east of *Kathmandú* than at the capital itself, or other places to the west of it. The town of *Bhat gaon* is not more than eight miles in a straight line from *Kathmandú*, and even there its violence must have greatly exceeded what it was at the latter place. To account for the immense disproportion in the loss of life and property at both places, something may be allowed for the more frail state of the buildings at *Bhat gaon*; but this is not sufficient, and this circumstance must be considered as inexplicable as most others attending this fearful phenomenon. The brahmans of Nipal say (and it is believed with truth) that the occurrence of a more violent earthquake than this is recorded in their histories. It was about 600 years ago, and then the cities of *Mangah*, *Patan*, and innumerable towns were utterly destroyed and thousands of their inhabitants killed*: the modern capital *Kathmandú* did not then exist.

III.—*Census of the Population of the City and District of Murshedabad, taken in 1829.*

To the five or six accurate estimates which we possess of the population of the cities of India, we are happy to be able now to add one of *Murshedabad*, both city and district, which we owe to the private or ex-official industry of Mr. H. V. HATHORN, while magistrate of that zillah in 1829. The detailed statements accompanying this officer's letter to the Government will be published without doubt in the Transactions of the Asiatic Society, to which body they have been transferred: we proceed however, as on former occasions, to offer an abridged analysis of the tables, that the readers of the JOURNAL may be in possession of all the accurate statistical knowledge of India furnished from authentic data. How easy would it be for every officer in charge

* The *Jyotishis* say that the planets Jupiter and Saturn were at the occurrence of this present one in the same situation as when the above destructive one happened. From this greater mischief was for many days after the 26th hourly expected, and many lucky moments were fixed upon by the said astrologers for the catastrophe; but all fortunately have come to nought, and although slight shocks continued to recur until about the 15th instant, no addition has been made to the effects of the one great paroxysm of the 26th.

	males.	females.
Proportion of sexes, Musulmáns,	28442	27648
Hindús,	44438	45648
Number of inhabitants per house, Musulmáns,.....	3.90	
Hindús,.....	3.48	
Average of the whole,	3.66	

Population of the District of Mīrshēdābād.

Names of Thannas.	Number of villages in each.	Number of houses		Total.	Number of Inhabitants.		Total.
		Musulman.	Hindu.		Musulmans.	Hindus.	
Gokaru,	149	2666	7724	10390	12771	38045	50816
Gowas,	87	8395	5427	13822	46716	27653	74369
Khāra,	114	3702	3413	7115	17863	16070	33933
Sulatābād, ..	158	5612	6904	12516	25368	30836	56204
Sūtī,	128	3021	1795	4816	28499	6163	34662
Harharpārā,	86	3862	7290	11152	16282	36827	53109
Govindpur, ..	121	1988	6166	8154	12305	27159	39464
Sharsherganj,	87	8395	5427	13822	40416	27023	67439
Kalyānganj, ..	113	868	4626	5494	4444	21865	26309
Nowadah, ..	33	1782	2732	4514	10460	12311	22771
Jalinghī	73	3944	3619	7563	19197	20598	39795
Chendaga ..	70	613	2302	2915	2820	10102	12922
Ranítalāo, ..	157	5780	6733	12513	34649	34768	69417
Bhadrihāt, ..	129	1269	3904	5173	5890	15500	21390
Banwa,	104	5080	10739	15819	16441	48012	64453
Mirzapur, ..	168	2862	10682	13544	14576	51615	66191
Dewānsaray,	141	4483	4634	9117	21831	22375	44206
Bhartpur, ..	152	6131	3541	9672	26198	18302	44500

Total of the district, ..	2070	70453	97658	168111	356726	465224	821950
---------------------------	------	-------	-------	--------	--------	--------	--------

Add for strangers or non-residents, .. 534

822484

	Males.	Females.
Proportion of sexes, Musulmans,	188036	168696
Hindus,	241710	223514
	429746	392210
Total of the Town and District, Houses,		208229
Inhabitants,		969447
Ratio of inhabitants per house, 4.73		

IV.—List of Birds, collected in the Jungles of Borabhūm and Dholbhūm.

By Lieut. S. R. Tickell, 31st Regt. N. I.

1. *FALCO LATHAMI. Colvy Falcon?* LATHAM. Male. From head to tip of tail 18 inches, breadth of wings 40 inches; eyes orange yellow, bill and cere bluish, top of head in front grey, sinciput pale orange-brown; feathers streaked dark and produced into a long horizontal crest, the end feathers of which are black, tipped with white; face and auriculars ashy; back of neck and top of back, pale rusty; feathers centered dark-grey brown; whole of back, scapulars, primaries, and part of tertials, dark clouded rich brown; coverts of wings pale rusty, clouded grey-brown, and blotched with white spots; some of the tertials

the same, greater coverts reddish ash-brown ; tail dark greyish brown, barred broadly with dark brown, and tipped obscurely white (as are the tertials), under parts white ; streak of black down centre of throat, neck white tinged rusty, broad bars of rusty on breast and belly, spots of the same on thighs ; legs clothed with short white feathers to the feet, which are of a horny color ; exposed part of the tarsi reticulated, claws black and solid. The head is broad, eyes protruding, crest erectile, bill with scarcely any notch, legs short and stout, body muscular and compact.

This subject was killed at Sísdah, in Borabhúm, in dense bambú jungle, occupying the interval between two ranges of hills. It was one of a pair ; the other, probably the female, appeared larger and showed more white on the wing. They perched high on the summits of tall decayed trees, and uttered wild plaintive screams. (The only specimen seen.)

2.—(*Honey Buzzard* ?) Length 19 inches, spread of wings 44. Female. Eyes yellow, bill blue, lores green, top of head, nape, and sides of chin, (at base of the bill,) white, streaked brown ; whole upper parts uniform clear ambre-brown, brightest on wings, dunnish on back, upper tail coverts pale rusty and whitish grey. Tail a hoary gull grey, primaries do. but darker and bluer : some of the outer ones nearly black, 3rd quill longest ; under part a clear reddish brown, legs yellow. (Tarsi reticulated.) Killed at Kosmak, in Borabhúm, in thick grass jungle, perching on the ground. Stomach contained lizards. It was in company with the annexed.

3. **FALCO HERBECOLA*. *Kohee Falcon*, T. Female. Length 18 inches, breadth 39. Aspect keen, body light and elegant, tail and wings long, tarsi elongated ; bill blue, tipped black, eyes dark, lores and legs yellow ; eyebrows, forehead, patch under the eye, and an indistinct ring round the neck, whitish ; whole upper parts pale brown, margined as in our female Kestrel (*F. TINNUNCULUS*), greater coverts dark lead brown, primaries brownish hoary grey, banded dark brown ; upper tail coverts white, with reddish brown crescent-shaped marks ; tail, two middle feathers full hoary grey, two next do. melting into rusty towards their shafts, outer ones pale rusty greyish white, the whole broadly banded with sepia ; upper half of outside tail-feathers banded rusty and white : all the feathers tipped white. Breast, belly, vent, &c. striped brown and fawny white as in female Kestrel.

* The names of such birds, as have never come under my notice before, and are necessarily of my own coining, I have distinguished by the addition of a T.

This and the foregoing species appeared tolerably common in those immense tracts of grass jungle which extend with little intermission from near the Kossai river, to the base of the Lakisinní hills, in Sutrakehanf. They perch on the ground, or on the small babúl trees which are interspersed among the jungle, occasionally soaring with a low steady flight over the top of the grass, in quest of prey. They are called by the Hindus inhabiting those regions, "Shahín" and "Kohf," and are much prized by the Coles for their hawking qualifications. The stomach of the present subject contained greater part of a Myna.

4. *FALCO NISOSIMILIS. Jungle Sparrow-Hawk*, T. Size and shape of English sparrow-hawk, upper parts and head a dun-brown; upper tail coverts pale obscure brown; tail as back, with four cloudy bands, tipped lighter; quills as back, eyebrows and forehead white; feathers tipped dark, auriculars, cheeks, and throat white with short brown stripes. Breast, belly, and thighs white, with transverse brown streaks, vent white. Thigh feathers each a little lower than knee, legs and toes long and slender as in sparrow-hawk. Bill and cere pale bluish, lore with dirty white bristles. Eyes pale gold, legs yellow, (tarsi scutellated): wings reach to the middle of tail, 4th and 5th quills longest. Eyes operculated by the brow as in *F. Nisus*. Male. Stomach contained lizards. Killed at Marcha, in Borabhúm. Frequents topes and cultivation.

5. *STRIX DUMETICOLA. Jungle Horned Owl*, T. Male. From head to end of tail 1 foot 9 inches, spread of wings 4 feet 4. Eyes deep gold, bill black, legs horny, and bare; claws black: whole upper parts, face, and crest pale brown; feathers centred darker, wings do. mottled with grey and blotched occasionally white; primaries and tail pale-brown, barred darker. Breast, belly, thighs and vent tawny-white, barred transversely with rusty and striped longitudinally dark brown.

Frequents the thickest jungle, in deep retired dells, between high rocks or scarped hills, perching low and passing the midday in the centre of some impervious thicket. It is however partially diurnal, and easily flushed in the brightest day, when it flies heavily over the underwood to a short distance, and drops headlong into the first convenient bush. Towards twilight, it emerges from its concealment, and may be observed seated with great majesty on the summit of some granite boulder, on the side of a hill overlooking the surrounding jungle. Its voice is hoarse and hollow, and connected with the gloomy scene and hour in which it is heard, the repulsive laugh in which it occasionally vents its notes "*Haw, Haw, Haw, Ho!*" cannot fail

to strike a fanciful listener with unpleasing associations. I met with two of this species near Sísdah in Borabhúm, probably a solitary pair, and have placed it as a new addition to the STRIX family, as it differs essentially from any yet described by PENNANT, LATHAM, or HARDWICKE, as found in India.

6. STRIX CANDIDUS, *Jungle Owl*. T. Male. From head to tail 16 inches, spread of wings 3 feet 4. Eyes black, bill and legs horny, tarsi denuded : whole upper parts shaded with dark and light brown, as in the short-eared owl, the feathers indiscriminately sprinkled with clear white spots ; primaries and tail tawny-brown, broadly barred darker, radial feathers of face, breast, belly and vent pure white. This species frequents the long grass jungle, and passes its life almost entirely on the ground, seldom perching on the lowest trees. When flushed, it rises heavily, and drops again into the grass, as suddenly as if shot. It is silent and solitary, the young keep in company some time after attaining their full growth. The jungle owl is found throughout Bengal and the upper provinces in tracts of long grass, to which it appears wholly confined. Male and female scarcely differ.

7. STRIX RADIATA. *Little barred Owl*, T. (*St. Castanoptera* ? Horse. Java.) Male. Length $7\frac{1}{2}$ inches, breadth 18 ; 4th quill longest. Bill greenish horn. Eyes gold, feet and claws horny, slightly feathered to the claws. Face, head, and upper parts pale amber-brown, clearest on head, greyest on scapulars and back, the whole barred with dull sepia ; greater wing coverts black, the outer webs of the feather white mixed with rusty, edges of wing chesnut, barred brown ; alula spuria and primaries do. barred black ; edges of scapulars have greyish white patches. Tail dark coppery brown, barred pale rusty ; breast as black but paler, the brown changing to griseous white towards the belly and thighs ; the whole under parts barred dingy sepia. Very common in the thickly-wooded parts of the Jungle Mehals, selecting the largest trees for its abode, from whence it keeps up its clamorous cries the greater part of the day. It is active, frolicsome, and diurnal, and feeds on insects.

8. STRIX LUGUBRIS. *Brown Wood Owl*, T. Male. In length 12 inches, breadth 2 feet 2. Eyes gold, bill and legs horny, tarsi and toes feathered, whole upper parts dull uniform brown. Beneath whitish, barred rusty ; primaries and tail, leaden brown, barred broadly darker. Inhabits the retired parts of the thickest jungle, coming towards the edges and open parts at night. It is completely nocturnal, and in a calm moon-light night, its incessant cries are heard to a great distance, resembling strongly those of a strangling cat. The only specimen seen was killed at Dampára, in Dholbhúm.

9. *LANIUS SILENS*. *Silent Shrike*, T. 9 inches from tip of bill to tip of tail, of which tail 4. Wings spread $14\frac{1}{2}$ inches, 3rd quill longest; eyes hazle, bill and legs black, plumage iron-grey, quills darkest; upper mandible slightly notched. Young bird is marked on the under parts with indistinct transverse bars. Common. Frequenting topes and large trees.

10. *IXOS VIRESCENS*? Temminck. Male. Size of a starling. Eyes blood-red, feet and bill dark, body plump, olive-green, palest on head, where it is slightly greyish, tinged with yellow on upper tail coverts, quills and their coverts do. edged brighter green; tail as back, long, square; vent and under tail coverts, chin and base of lower mandible pale clear yellow; over the eye, and a spot on base of upper mandible, extending below the eye to the auriculars, obscure white; lower parts whitish tinged pale yellow; breast dashed with grey, bill deeply notched.

Killed in woody and barren country, at Bamireah, near Midnapur: appeared shy, silent and solitary, and partakes of the nature of the fly-catchers and thrushes. It flew and settled about the lower parts of bushes and thickets. Stomach contained berries and seeds.

11. *DRONGO CÆRULESCENS*. *Fork-tailed Shrike*, Latham? Male. Shape and size of the smaller "King Crow." Head gross, bill hooked, not notched; eyes orange-red, bill and feet black, tail deeply forked, as long as the body; whole of upper parts dull metallic-black, deepest on head, brownest on quills; chin, throat, and breast iron-grey, below sternum white. Female does not differ. Frequents high timber, and is tolerably common. Note a wild mellow whistle, pleasingly and fancifully modulated. Insectivorous.

12. *LANIUS GRISEUS*. *Grey Wood Shrike*, T. Male. Length $6\frac{1}{3}$ inches, ashy-brown above, dull-white beneath; bill, eyes, and legs dark; mandible hooked, not notched; two centre feathers of tail as back, two next black, outer ones white; dark brown patch through the eyes, a white one above them, obscure brown mark from under mandible; breast tinged dusky reddish ash. Shy, solitary, rather rare, frequents soul jungle, has a jarring note.

13. *VANGA FLAVIVENTRIS*. *Yellow Bulbul*, T. (*Lanius Melanocephalus*? Gml. *Turdoides Atriceps*. Tem.?) Male. Length 7 inches. Eyes pale yellow, bill black, legs dark horn. Head and a slender erectile crest glossy-black, rest of plumage olive-green above, clear olive-yellow beneath; belly and vent bright yellow, quills and tail dusty. Frequented the beautiful hanging-woods of Dampára, in Dholbhúm, where alone I met with them. Manners sprightly, hurrying from tree to tree, with a short repeated song, like the common bulbul.

14. *CRINIGER SPLENDENS*, T. (*Irena Puella*,? Horsf. *Edolius* ? of Natterer) The bill totally dissimilar to the *Drongo*, with which *Irena* and *Edolius* are grouped. It is long, hooked equally in both mandibles, nostrils denuded, and more like the bill of the *Chough* than any other bird. The chief peculiarity of the bird is a crest, composed of long recumbent hairs, which ride from the head and fall back on the shoulders. The tail is long, slightly forked; the ends of the outer feathers turned up, in the shape of a scoop. In other respects it resembles the *Drongo*. The plumage is deep black, reflecting purple and blue in various lights; the wings are a deep glassy-green. These birds are tolerably numerous, but confined in locality. They frequent the large timber, which luxuriates in the lower portions and richer soil of the jungles, on the banks of nullas, tanks, &c.: the cotton tree, when in blossom, is a favorite resort, where they may be seen in small parties frolicking about. The voice is very changeable and in constant exertion, from a beautiful song, to whistling, chattering, and creaking, like a rusty wheel. The notes at times resemble the higher strains of an organ, and heard in the wild and lovely scenes where this bird is found, appear singularly striking and plaintive.

15. *MUSCICAPA TYRANNIDES*. *Shrike-like Fly-catcher*, T. Male. Length 4 inches. Eyes orange-hazle, bill and feet black. Bill flat, broad, long, straight, hooked, not notched. Head, nape of neck, back, wings and tail, black; rump, wing coverts, and line along tertials, and a broad streak along auriculars, from base of bill, white. Breast and belly pale silvery grey. Outer tail-feather white. Killed at Sísdah in Borabhúm. Rare, frequents high timber, has a slight song.

16. *MUSCICAPA PRINCEPS*, Cuvier; *M. Miniata*. Temmink. Rare. Indiscriminately spread through the jungles. Sometimes solitary, at others, flying in small parties. (Figured in Gould's Century of Birds.)

17. *M. HYACINTHA*, Temmink. Size of a Robin. Male. Upper parts, wings, and tail ashy Antwerp-blue; between the eye and beak a dark space. Chin and breast buff-color, rest white. The colors are paler, but distributed not unlike those of the American blue Robin. Rare, silent, frequenting high trees: killed at Lika in Borabhúm.

18. *MUSCICAPA OCCIPITALIS*. Common in all parts of the jungles.

19. *M. CÆRULIA*. Common.

20. *M. MACULATA*. *Pied Fly-catcher*. Linn. Marked the same as the subject mentioned in Bewick. Rare.

21. *M. PEREGRINUS*. *Parus* ? Figured in Gould. Common in the jungles. In manners closely resembling our long-tailed titmouse. The males unite in flocks apart from the females at the close of the cold season.

22. *MOTACILLA SYLVATICA*, T. Rare, shy, found in low, barren saul jungle; black, with white wing covers, small.

23. *M. LUZONIA*. Numerous, frequenting high timber near nullas, &c. well known in Bengal as Indian Robin.

24. *TURDUS MACROURUS*, Vaillant? *Shahmour Warbler*. $9\frac{1}{2}$ inches long, of which tail 5; plumes glossy-black, tail cuneiform; outer feathers tipped white. Upper tail coverts white, lower part of breast and belly deep chesnut, eyes and belly black, legs fleshy horn. The Shahmour is well known and justly prized in India for its song, which in its native jungles is heard in a degree of perfection, to which the notes, when engaged, can bear little comparison. It is spread throughout the jungles, and haunts the deepest glades and hollows, keeping in the centre of thickets. In the grey mornings and evenings the notes are heard through the valleys, ceasing with twilight. The song of the Shahmour is fully equal in compass, power, depth and modulation to that of the Nightingale. The strains sweep with a gush of sweetness through the enchanting solitudes which this bird makes its favourite resort, at times when the other inhabitants of the forests are silent in rest. And in unison with the surrounding scenery, in which nature seems to have lavished every fantastic invention of beauty, the effect produced on the mind and ear can alone be appreciated by those who have witnessed the magnificence of a tropical forest.

25. (*MOTACILLA SUECICA*, *Blue-throated Warbler*. Linn?) (*Sylvia Cyanecula*, Meyer?) Male. Size and shape of Redstart, whole upper parts dark olive-brown, feathers of the crown centered darker, with a white patch over the eyes as in Whinchat. Eyes, bill, and legs dark horn, throat cobalt. The space from thence to the sternum is divided into transverse portions of color. Uppermost a band of chesnut-brown, then one of cobalt-blue, then white, and lastly chesnut again; below this all white; on the centre of the neck, adjoining the blue and chesnut of the throat, are two confluent patches of white and dark brown. A single specimen of this elegant species was seen and killed at Bamirah near Midnapur, in wild bushy country.

26. *MOTACILLA CALLIOPE*. *Ruby-throat Warbler*, Pallas. (*Turdus*, apud Latham and Gml.: *Accentor*, apud Temminck.) Male. Length 6 inches, plumage above olive-brown, beneath dull whitish. Band above and below eyes white, intermediate space black, feathers of throat slightly *scaly* (stiff and strongly scutellated); light scarlet with silvery edges; bill and legs horn, eyes dark. Rare, solitary, silent. Haunts thickets and underwood. Found at Dampára in Dholbhúm, and at Jehanabad, west of Hoogly.

27. *M. RUBICAPILLA*. *Rusty-crowned Warbler*, T. Female. 5 inches, eyes reddish hazle; bill and legs pale horn, crown of head rusty; feathers of nostrils, over the eyes, auriculars and sides of neck, pale yellowish green; upper parts olive, throat and breast pale yellow, shafted black. Found in the thick underwood, hollows, ravines, &c. Lively and agile, with a frequent piping note and occasional chatter.

28. *M. CANTATOR*, *Chiming Wren*, T. 4 inches. Male. Eyes hazle, upper mandible dark, lower pale orange; legs pale horn, crown black, with a longitudinal central yellow stripe; black stripe through eye and a yellow one over it; throat bright yellow, extending towards breast, lower parts lint-white, vent yellow; plumage above, clear olive-green. Frequents trees in the thickest parts of the jungle. Has a loud and incessant note, "pio, pio, pio, pio." Bill rather gross, as in *Winchat*, not flattened, not hooked as in *Regulus*, slightly notched: nostrils large, oblong, almost pervious.

29. *SYLVIA LONGICAUDATA*. *Long-tailed Warbler*. Gml. (*Malurus* of Vieillot.) Male. $5\frac{1}{2}$ inches, of which tail $2\frac{1}{2}$, bill and eyes dark, legs orange-horn color. Upper parts a pale dull brown, on face ashy. Under parts satin-white; quills and coverts pale clear brown; tail ashy brown, tipped obscurely black and then whitish; wings much rounded and short; first quill almost spurious, 5th and 6th longest; tail cuneiform. All the plumage waving and flimsy in texture, scarcely any tail coverts. Common. Has a sprightly intermittent song, perching for a time on the summit of a bush and then seeking thickest underwood. Frequents barren saul jungle.

30. *MOTACILLA OFFINIS*. *Olive Willow Wren*, T. (*Willow Wren*?) $5\frac{1}{2}$ inches. Male. Upper parts dark olivaceous ashy-brown. Beneath, brownish yellow ochre. Clear yellow streak over eye. Upper mandible dark, lower pale horn: legs horn, eyes hazle. Killed in high-timbered jungle, on the banks of a stream.

31. *M. DUMETICOLA*. *Thicket Warbler*, T. Male. Nearly 6 inches long, eyes reddish hazle, bill as former subject, legs pale fleshy horn; crown dingy rust, face and over eyes dirty whitish brown, auriculars darker. Whole of the plumage dull olive-brown, as in the thrush; tail slightly rounded, whole under parts white, streaked with the color of back, throat white. Female and male alike. Frequents the thickest foliage, at the top of high trees, and is rarely seen. Has a monotonous note, consisting of three sounds, which is heard incessantly during the morning.

32. *M. FULICATA*. *Sooty Warbler*, Cuvier. (Bill in no way allied to the groupe in which Cuvier has placed it.) Male. Size of a

robin. Upper parts dull dark brown ; under parts, including the eye, burnished black ; greater wing coverts white, next greater as back, but with a gloss of steel ; tail black, vent and centre of belly chesnut, quills of wings a deep claret-brown. Frequents low bushy jungle, and has the manners of the stone chat. The bill however is cylindrical, long, thin, partially curved, not unlike that of the house wren. Bill, legs, and eyes dark.

33. *M. SUBVIRIDIS*, T. Male. Allied to the *M. Zeilonica* of Horsf. Bill and legs pale bluish horn, eyes hazle ; plumage above olive-green, below olive-yellow ; wings black, edged yellow, greater coverts tipped white, tail dark olive-green. Common in thick bambú or saul jungle, on hills.

34. *TURDUS LIVIDUS*. *Leaden Thrush*, T. Head and neck pale orange brown. Rest of plumage blue grey. Size of a redwing. Female rather larger and duller in plumage. Shy, silent, solitary. Frequenting thickets in rocky jungles. Killed at Lattapora, in *Borabhúm*. Rare.

35. *T. UNICOLOR*, T. Size of preceding. Female. Eyes dark, bill and legs yellow horn, plumage a dirty grey, mixed on the back with olive, tinged on the head with brown. Wings and tail brownish ; coverts of tail iron-grey ; breast Isabella grey, belly white. Silent. Frequents large trees. Rare. Killed at Bansíghar in *Borabhúm*.

36. *ORIOIUS M'COSHII*, T. Male. Length 9 inches. Bill, feet, and eyes black. Top of head black, each feather edged yellow ; forehead yellow, throat and front of neck white, streaked black. Rest of body yellow ; coverts all centered black, quills brownish black, fringed pale grey-yellow ; tail centered olive, tinge of olive on back. Frequents the highest trees in open jungle cultivation, &c. Sings beautifully. (The only specimen seen.)

37. *NECTERINIA SEHERLÆ*, T. (*Cynniris Gouldii* ?) Male. Length 4 inches. Crown burnished copper, with green reflections. Neck, back, and breast, a deep blood carmine color. A stripe on each side the throat, from the under mandible brilliant violet ; lower part of back yellow ; tail coverts bright green, tail violet and green, blended with metallic lustre ; quills dusky brown, belly and vent dusky ; eyes, bill, and legs dark. This rare and elegant subject was procured near Seheria in *Borabhúm*, flitting about the low willow bushes in the dried bed of a stream. It has no song, but a shrill chirp.

38. *N. MINIMA*, T. Male. Length 3 inches, plumage ashy olive, paler beneath ; wings and tail brown. Common in saul jungle.

39. *CHLOROPSIS CÆSMARYNCHOS*. *Hook-billed Chloropsis*, Jardin. Appears to be completely out of its place in Cuvier's arrangement. But

the description is scanty and ambiguous, and may possibly not refer to the present subject. Male. Length $7\frac{1}{2}$ inches. Bill as in warblers, but hooked throughout, (much, as in *Certhia*.) Toes, three before, one behind; plumage parrot-green, palest beneath; throat, part of cheek, and forehead black; a lilac spot by lower mandible, spot of bright blue on humerus; bill black, eyes hazle, legs pale bluish horn. It has a beautiful song, and is common in the jungles, flying about in small parties. It is an excellent mocker, and imitates the notes of almost every small bird of the country. (Frequently sold in cages at Calcutta and Monghír.)

40. *EMBERIZA SYLVATICA*. *Bush Bunting*, T. Very common throughout India.

41. *LOXIA BICOLOR*. *Gobergoose Grosbeak*. T. Male. Length $4\frac{1}{2}$ inches. Bill dark bluish, eyes hazle, legs dark; breast, belly, and part of upper tail coverts white; rest of plumage dense brown; tail black, cuneiform. Flies in small flocks, with a low piping note, frequenting sugar fields, low bushes. Fructivorous.

42. *FRINGILLA AGILIS*. *Piping Finch*, T. Four inches long; plumage ashy-olive, with grey and greener portions; below dull white tail partially tipped white; legs black, bill bluish, eyes orange. Perched on summits of trees. Appeared lively and agile, with a sharp clear whistle. Not uncommon.

43. *EMBERIZA OLIVACEA*. *Kirwa Bunting*, T. Male. Rather larger than a sparrow. Olive-brown above, obscure white beneath; feathers of head and neck centered darker; greater coverts dark brown, tipped white; tertials do. edged olive and tipped grey; primaries and tail dark-brown edged olive-green; eyes hazle, bill bluish, legs flesh. In flocks, on open cultivated land.

44. *FRINGILLA FLAVICOLLIS*. *Chilliamsa Finch*, T. Male. Size of a sparrow, slighter, with longer bill and wings; the same color as the hen sparrow. Lesser coverts chesnut; throat white, a patch of yellow immediately below, in front of neck.

45. *PICUS GUTTACRISTATUS*. *Pearl-crested Woodpecker*, T. (*P. Amantius*, Horsf. Java ?) Female. Length $10\frac{1}{2}$ inches, bill $1\frac{4}{5}$; eyes amber yellow, bill blackish horn, legs pale blue, forehead dusty brown; crest large, full, black, with round white spots; neck white, with broad longitudinal black stripes, one through eye, two narrower from maxillary angle, confluent below auriculars, another down centre of neck; front of neck, breast and belly, marbled black and white; tail and quills black; back and upper tail coverts pale bright scarlet, with subterjacent white bars; rest of upper parts and coverts deep olive-gold color.

Common. Frequenting the largest timber, cotton trees, &c. Noisy, agile.

46. *P. BENGALENSIS*, Horsf. Differing merely from the foregoing in having the crest red and the tail coverts the same as the back. Is too well known in Bengal to require description.

47. *P. AUROCRISTATUS*, T. Plumage and size scarcely differ from that of the *P. Medius* of Bewick. The crest is of a golden-buff color, with the extremity scarlet; lower parts brown and white; belly scarlet. The male is $\frac{1}{3}$ larger than the female. The latter has the entire crest golden-buff. Pretty common in thick jungles. Has a squeaking monotonous note.

48. *SITTA FRONTALIS*. Swainson. *S. Velata*, Temminck. *Orthorhynchus Frontalis*, Horsf. Java. Does not differ from the description given in Cuvier. Rare. The single specimen seen was procured at Kankarjurí, near Dampára in Dholbhúm. It flies and climbs about the underwood with great rapidity, and is found in the thickest parts of saul jungle.

49. *BUCEROS MALABARICUS*. *Malabar Hornbill?* Male. Length of bill 7 inches; of excrescence 8; from maxillary angle to end of tail 2 feet 3, of which, tail 1 foot 1; from tip to tip of wings, 3 feet 2. Bill pale yellow, excrescence or horn black, with a broad lateral irregular line of yellow, occupying nearly the whole of it; pale, livid-fleshy patch on the base of lower mandible; eyelids ciliated, eyes scarlet; feet iron-grey, tarsi strong, thick, short, and scutellated; from sternum downwards, and all the feathers of the tail (except the two centre ones) white; rest of plumage shining metallic black.

These birds were very common in all the more open and large timbered spaces in the jungles, frequenting in preference the píepal trees, the berry of which forms their principal food. The young continue with the parent birds for many months, after leaving the nest; hence these hornbills are generally met traversing the forest in flocks of eight or ten. They are shy and wary, and the voice loud, clanging, and harsh. The horn is not developed till after the first year, the nestlings having the bill plain and without any trace of excrescence. These birds are never met with in the high rocky lands, nor in the barren tracts of saul jungle, but abound in the rich meadows composing the valley of the Subonrika, where the country in many parts has the appearance of a well-cultured English park.

50. *B. GINGIANUS*. *Gingi Hornbill*. Very common in the same haunts as the foregoing, and well known throughout India.

51. *BUCCO LINRATA*. *Hackled Barbet*, T. Male. Length 9 inches; shape and manners of *B. Lathamii*, (the well known green species.) Bill

and base space round eyes orange ; eyes grey, feet horn ; head and neck as far as breast, and back, brown with light shafts ; the feathers narrow and pointed ; rest bright green, pale on belly.

52. TROGON DUVAUCELII. Duvaucel's *Curucui*, Vaillant. This most elegant subject is described in Cuvier. The solitary specimen seen was killed near Dampára, Dholbhúm. It frequents the thickest jungle at the bottom of ravines and dried rocky nalas, flying from tree to tree, with a wild querulous note, like the mewing of a cat. It pursues and catches insects on the wing, like the *Muscicapæ* : the stomach of the present specimen was crammed with them. The bright and glowing colors of this bird seem little suited to the gloomy depths which are its resort. Those abodes of everlasting shade, where the meridian sun barely penetrates, overhanging arches of vegetation, and which are inhabited by undisturbed flocks of bats, owls, and night-jars, afford a striking exception to the general rules of nature, which has clothed in sombre garbs "the birds that shun the light," by harbouring so beautiful a tenant as the *Curucui*.

53. CAPRIMULGUS ALBONOTATUS. *Dampára Night-jar*, T. Male and female alike, larger than the common English night-jar, which it closely resembles ; the plumage is greyer however, and it is distinguished by a large patch of white on the neck, two or three on the tertials, and on the outer feathers of the tail. It is extremely common in the jungles, keeping in thickets during the day, and coming out as evening sets in, to the open parts, grass plains, and *khéts*, which it skims over with a low silent flight. When on the wing it emits a low chirp, something like a sparrow. It has another and very peculiar note, when seated on the top of some decayed tree, and which on a calm night may be heard for a mile, sounding as if some one was striking a plank with a hammer deliberately.

54. HIRUNDO CORONATA. *Dhudka Swallow*, T. (*H. Cristata* of Le Vaillant?) Male. Length 8 inches, 1 ft. 1 across the wings ; cheeks and base of lower mandible chesnut ; from eye to bill, black space ; head adorned with a pointed, erectile crest, of a bluish clear grey, as are the upper parts ; breast and belly do. paler ; wings and tail glossy black with green reflections ; eyes, legs, and bill dark. The female has a smaller crest, and instead of the chesnut mark on the face, a black patch, bordered below with a white line. They fly in large flocks, but are partially met with hovering over the marshy spaces in the jungles. The note resembles the monotonous "*kia, kia*" of the parrot. They disappear in those regions by the end of March, but I never could trace the direction of their flight.

55. COLUMBA SYLVATICA. *Great Jungle-Pigeon*, T. Length 13 inches. Eyes orange, feet rose-color, bill horny, bluish over the nostrils; head, breast, belly, a pale violaceous grey, with vinous tints; upper parts, wings, and tail, brilliant changeable-green, with purple and coppery reflections. Common in some parts. Preferring the open and large-timbered tracts. Wild and difficult of approach. They go generally in small parties of four or five. The voice is deep, and resembles groans. Sexes alike.

56. C. AGRICOLA. *Foxy-Pigeon*, T. Male. Length 11 inches; eyes orange; bill and feet lake; head, neck, and breast reddish vinous brown; forehead and belly ashy blue; back, coverts, and quills vinous chesnut, each feather centred dark brown; upper tail coverts iron-blue grey; tail dark-clouded brown, patch of black; white-edged feathers on each side the neck. Met with in open cultivated parts. Shy and difficult of approach.

57. C. JAVANICA. *Java Turtle?* Male. Length 8 inches; tarsi elongated as in the ground-turtle, nevertheless perches; tail short, rounded, fourth quill of primaries longest; crown, pale ashy-lilac, which extends along the back of the neck to the back; white patch over eyes, enclosing forehead; rest of head, neck, breast, and belly vinous-grey, with a rosy blush; some of the feathers of the back black, edged green; lower down a broad bar of brown, edged black and white above and below; upper tail coverts blue-grey, primaries dusky-brown; the rest of wings a deep brilliant green, flashing gold in various lights; tail black, outer feathers white with black tip; bill red, tipped black, eyes black, legs flesh-color. This most elegant and diminutive species haunts the most impervious parts of the jungle, and is seldom seen except in the cool of evening, when it repairs to the open parts of streams and meadows. Two specimens alone seen in the Jungle Mehals, one of which, the female, differed merely in having the green of the wings tarnished with copper.

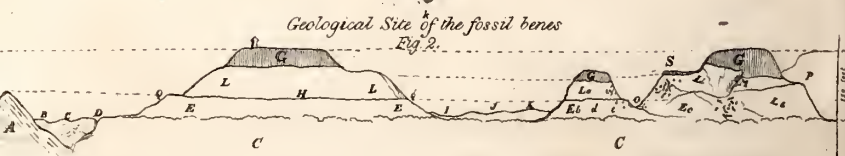
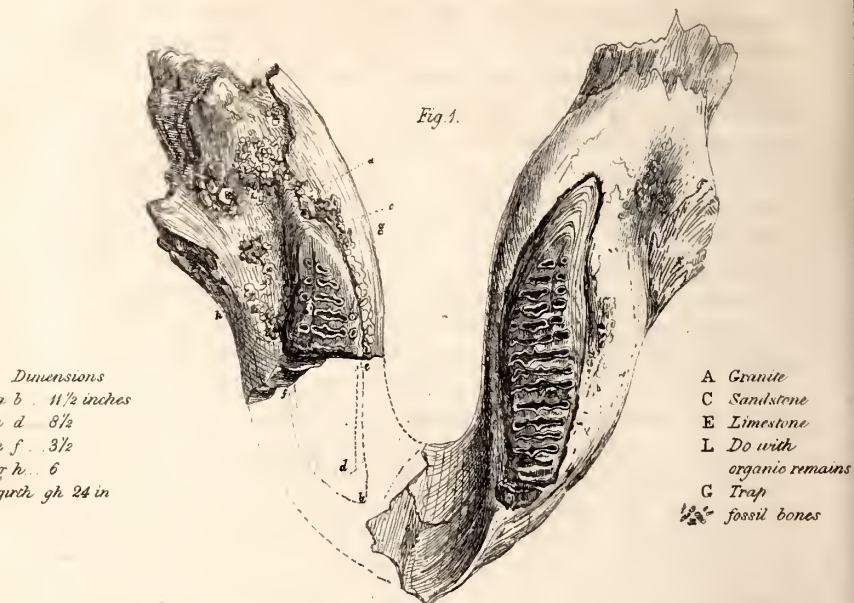
58. The Stone or Norfolk Plover of Bewick, abounds in every open tract in the jungles, coming out to feed at night.

59. RALLUS JAVANICUS, T. (*Gallinula Javanica*, Horsf, Java.) Male. Size and shape of the *Parra ænea*; the claws however as in *Gallinula*. Eyes blood-red; bill pale green, with orange-colored ridge; nostrils pervious; whole upper parts, quills, and tail plain black, with greenish reflections on the coverts; belly, vent, under tail-coverts, dusky-red; inside of thighs dirty white, outside chesnut and dark-grey, legs dusky. A solitary specimen seen at Tumcharararo, in Borabhúm. Had the same haunts and manners as the common *Parra* of Bengal.

60. *PARRA ARATA*, T. Male. Size and shape of *P. ænea*. Eyes dark hazle; bill greenish horn, upper mandible darker, nostrils pervious; a flap of detached skin on the forehead, crown deep bay or dark chesnut; eyebrows light, face white; from the back of the head, along the nape of the neck, glossy purple-black, changing to lake and coppery purple towards back; throat and narrow strip in front, extending to middle of neck, white; rest of neck and breast pale buff; belly and vent white; back cupreous olive-green; upper tail coverts and tail a burnt copperish lake; primary and secondary quills black; tertials as back, partly fringed white; greater coverts black, smaller coverts and scapulars as back; outer side of thighs, black and white radiated; inner white, flanks black. Pretty common, in small marshy pools, overgrown with jungle.

A great variety of birds in addition to these, met with in the Jungle Mehals, might be added to the list already enumerated; but as they are indigenous to the whole or various parts of Hindustan, and have been described by former collectors, their insertion here would be a useless repetition. Ornithological research, which has made such extensive progress into the heart of America, Africa, and the comparatively unknown regions of Australia, has as yet had little insight into the productions of this country. especially in those parts which have not been more immediately located by Europeans. Many of the most rare and beautiful birds, inhabiting the Himálaya mountains and the adjoining forest in the Teraye, have been brought into notice by the talents and spirited researches of one or two gentlemen; but even supposing their exertions would make us eventually acquainted with every species found in those immense tracts, there yet would be left a wide blank in our acquisitions, so long as the extensive, unknown, and unvisited portions of the Jungleterry districts remained shut out from the inquiries of the naturalist. These regions, placed in a sensibly warmer latitude than the Nipal forest;—differing in soil, in altitude, in vegetable productions;—presenting ever to the eye an altered, a peculiar, appearance of scenery;—rendered in parts uninhabitable even to the half-humanized denizens of the jungles, from the influence of pestiferous exhalations, issuing more or less throughout the year from abysses, overgrown by rank vegetation, where the light of day seldom enters, and the cadaverous weeds, fixed in a stagnant atmosphere, never wave in the refreshing breeze;—afford asylums to the rarer and wilder animals of the forests, which few or no human footsteps have invaded. The Trogon or Curucui (No. 52), hitherto asserted as belonging alone to the interior of Africa, has been found here. The Hippopotamus, also exclusively consigned to Africa,

Fossil jawbone of an Elephant found near Jabalpur



Silicified fossil shell from 18 miles
east of Jabalpur (p. 205)

Voysey's fossil shell
(see p. 94)



Recent Land shells from Silhet.



Spiraculum hispidum

Spiraculum parvum

has been met with in the portion of jungle which extends into the Bhíl country*. The Gour, a species of bull, which by its description (as taken from a young one) must be the noblest in appearance of all known animals, ranges the hilly portions of the jungles, defying pursuit. A snake, which by the testimony (exaggerated doubtless) of the natives, must equal in dimensions the pythons of antiquity, inhabits the low marshy recesses of the jungle. A flying squirrel, hitherto undescribed, is tolerably common; and lastly, from a casual glance I once caught of an animal, in the thick and high woods bordering the Gurum nala, near the valley of the Subonrika, it would be the corroboration of an anxious surmise, were after researches to establish the fact, that the *Orang Otang* is an inhabitant of these forests.

V.—*Note on the Fossil Bones discovered near Jabálpur. By J. Prinsep, Sec. As. Soc.*

[Read at the Meeting of the 30th October.]

The last despatch from our zealous and disinterested contributor Doctor SPILSBURY puts it in our power to speak with some degree of precision of the nature of the fossil remains discovered by Captain SLEEMAN, and followed up by himself, in the neighbourhood of Jabálpur—a field, it must be remembered, that had been passed over by Captain FRANKLIN and other geologists without any suspicion of the existence of such treasures.

The despatch I allude to consists of a classified series of specimens of the strata wherein the bones were found imbedded, with references to a rough vertical section of the country. (Pl. xx. fig. 2.)

We observe that the low plains covered with jungle, at the foot of the hills in question, consist of sandstone lying upon granite, which protrudes in several places, as at A A A. towards the town.

Above the sandstone lies a conformable stratum of compact silicious limestone, which on solution in acids proves to be composed of grains of clear silex, united together by carbonate of lime, here and there tinged with chlorite, or holding nodules of that mineral imbedded; at other places, passing into pure quartz, and jasper conglomerate: no stratification is perceptible in the limestone, which seems rather to bear the character of a tufaceous deposit. At one place, E c, an oval

* I have been credibly informed of this, by several who witnessed the animals at a distance, and afterwards examined their foot-marks (their surmises being corroborated by the natives of the country.)

concretion is enclosed, which resembles a seed or almond:—it is filled with green earth.

Towards the southernmost hill this rock contains bones imbedded in its substance, and having that pink colour observed in the first specimen sent to the Society; they are accompanied with water-worn pebbles and chlorite.

Half way up the same rock, of which Dr. SPILSBURY represents a clear section to be open to view from Q to P, a platform (Q P) exists, varying in breadth from five to twelve yards. This Mr. LYELL would explain to indicate (as the rock above and below is of the same quality) the existence of an ancient coast, worn away by the gradual action of water before the level of the latter was depressed: another partial ledge occurs on the surface of the silicious limestone, marking an anterior water line, when only the superincumbent beds were exposed to the corroding action of the sea or lake. It was upon this ledge in the southernmost hill that the first bones were discovered, imbedded in a gravel or alluvial conglomerate.

The uppermost rock is a flötz trap, or horizontal bed of compact volcanic basalt, which must have been spread over the whole surface long before the denudating causes began to prevail, though posterior to the existence of the animals whose bones are imbedded in the subjacent rock at L *b*; unless indeed it should turn out that the breccia containing them occurs only in exterior patches, formed of their detritus, and containing also portions of the basalt, which one or two of the specimens whose labels are lost seems to render probable.

Of the nature of the bones found imbedded at L *b*, and of the period in the history of the globe to which they belong, the imperfect broken state of the fragments precludes us from pronouncing any opinion. Fortunately, however, Dr. Spilsbury's discoveries did not stop here; as he correctly observes himself in one of his letters, one discovery has gradually led to another, and he has become a geologist in spite of himself, by the force of accidental circumstances, and the intense interest which such discoveries are calculated to awaken in the mind of man. 'A notice is inserted as a hint in the Journal, that fossil bones may be met with near Jabálpur:—"I am put on the *qui vive*—set out for the hills and bring in a collection of specimens:—my people perceive my curiosity, and bring me in any thing uncommon they meet with:—I go to Brimhan Ghat, whither the European residents have constantly resorted for years past, and the moment my mahout sees a huge bone, he brings it to me, and it is discovered to be an elephant's jaw-bone in a perfect state of preser-

vation." A Fakir it seems had occasion to pull down and rebuild his hut, near the banks of the Nerbudda, when in the foundation these curious reliques were found and thrown aside. "So again," says Dr. S. "some four months ago, a little boy tells me of a wonderful skeleton, said by the natives to be that of a giant, describing the fingers as a foot long: a *patèl* has a *kneepan* that serves for a scale to weigh 3 or 4 seers of cotton in;—'is not this,' says the boy, 'as wonderful as your jawbone?' to this I readily assented, determined at any rate to sift the rumour. It was stated to be in Captain GARSTIN's district in the *Omar Nadí*, about two kos (9 miles) from *Narsinhpur* (Garawára). I applied to Captain GARSTIN, who, owing to the rains, was only two or three days ago able to send me in a specimen. I suspect it will turn out to be a fossil elephant, but I shall be better able to speak on the subject when I have visited the spot on my way to *Narsinhpur* a few days hence."

Thus are our eyes at once opening to an unexpected and most interesting object of geological research. Upon the first inspection of the fragments the question naturally arises, to what animal do they belong, and to what species? as it may be remembered that all the fossil mammalia discovered in the tertiary deposits of Europe and America, and even those brought away by Mr. CRAUFORD from Ava, have been pronounced to belong to extinct species by the most competent authority, and generally on the unequivocal testimony of skeletons, nearly complete, if not perfect. It would be rather hazardous therefore to pronounce upon the single half jaw-bone* before us, that the Jabalpur fossil elephant was an exception to the general rule; yet, upon comparing the specimen, side by side, with a recent skeleton in the Society's museum, it is impossible to discover any such distinction as should constitute a difference of species: it is in all respects of the Asiatic type of elephant, and can be confidently distinguished from the *elephas primigenius* of CUVIER, so common in Germany and throughout Asiatic Russia, which has itself been pronounced "more different from the Indian species than the ass is from the horse, or the chacal from the wolf and fox."—*Pidgeon's Fossil Remains*, 59.

I hope that the accompanying drawing will enable more experienced geologists to decide the question of the identity of the specimen with the existing species of elephant; for although it may thus lose in antiquity, it may perhaps gain in value, as an intervening link between the inhabitants of our planet in two geological periods now separated by so strong a barrier of dissimilar organization.

* Part of the opposite jaw has been since received, and has been added to the drawing. (Pl. XX. Fig. 1.) They are both inverted in the engraving.

While committing the foregoing notice to press, I have received the following account from Doctor SPILSBURY, confirming the expectation alluded to in his former private communication.

J. P.

Account of the Fossil bones discovered in the bed of the Omar Nadi, near Narsinhpúr or Garawara, in the Valley of the Nerbadda. By G. G. SPILSBURY, Surgeon to the Nerbudda Commission, &c.

Some months ago a native report reached me, that in a nala of the Narsinhpúr district the skeleton of a giant was to be seen, the fingers of which were said to be three feet long, and that a kneecap served as a weight of five seers to the *patel* of the village. On hearing this I applied to Mr. GARSTIN, the magistrate of the district, requesting him to inquire into the truth of the story: that gentleman immediately with his accustomed kindness sent out and procured some specimens, which he forwarded to me at Jabalpur. Finding they were fossil bones, I made arrangements for visiting the spot in person, and beg to forward the accompanying specimens and plan of the place.

At the spot marked A a, (Pl. XXI. fig. 1.) the water had worn away much of the stone, at the under side of which I could perceive a large bone. By the aid of villagers, and digging all round, I was able to upset this stone, under which imbedded lay a thigh-bone five feet three inches long*, quite perfect from the round head to the condyles, and altogether a most magnificent specimen: in turning over the stone, however, it was split into two pieces, and the bone fractured about two feet from the condyles. A is the general rock found in the bed of the river,—B portion from that in the stream—b c, spots where large fragments of bones (one apparently the condyles of a similar thigh-bone) were lying. In the dry bed of the nalla are strewed nodules of which the accompanying is a specimen, and generally about that size. I send a small tooth (fig. 3) which I picked up between A a and the fossil imbedded in the cliff. The tradition of the village is, that the head of this animal was washed down the river some sixty or seventy years ago. I obtained one large tooth from the Thakúr of Omarin; this, together with five specimens, I hope at a future opportunity to submit to the notice of the Society.

Description of Plate XX. illustrative of the Jabalpur fossils.

Fig 1. Represents a superficial view of the two fragments of the fossil bone, placed as forming parts of the same lower jawbone of the elephant, which on comparison with the plate in CUVIER or GRIFFITHS will be found not to differ materially from the type of the Asiatic species. The central connecting part is represented too broad. The surface of the bone is in many places, and especially in the cavities, covered with small granitic gravel, cemented with lime. On dissolving a portion of the bone in acid, a fibrous skeleton remains of silicious matter, which has occupied by infiltration the place of the animal matter: the ivory of the tooth dissolves without residue. The dimensions of the tooth as shewn on the plate are, in length $11\frac{1}{2}$

* Diameter of the bone about the middle and its smallest cylinder nearly six inches.

inches: breadth, $3\frac{1}{2}$ in.: grinding surface $8\frac{1}{2}$, by 3 in.: girth of the jaw-bone, 24 inches, and probable length from K, the apex of the chin, to the socket, 26 inches.

Fig 2. Represents a geological section of the insulated hills to the east of the line joining the cantonments and the town, distant $1\frac{1}{2}$ miles. The letters refer to the specimens sent down by Doctor SPILSBURY.

A. Granitic hills to the north, extending to the town, where they dip, and rise again near Garrah; white quartz and felspar, dark grey mica.

B. Smaller grained granite, decomposing.

C. Granitic sandstone, friable, fine grained.

D. (From a watercourse), ferruginous sandstone, shewing the action of fire. Between D and E, veins of quartz protrude.

The loose sandstone is stated to form the whole surface of the plain, covered with low jungle at the foot of the hills, intersected with ravines. In it, half way between the residency and the city, was found the specimen of silicified wood, formerly presented.

At I and K seams or beds of fine potter's clay are found: at J the sandstone is quartz, ferruginous, and friable.

EE is a compact silicious limestone, containing crystals of calcareous spar, shell impressions (?) and amygdaloidal concretions filled with chlorite, which have the appearance of fossil seeds. At Ec Ed it incloses quartz pebbles, and fragments of bone mixed up with green earth, and apparently incorporated with the substance of the rock: in some places the limestone passes into quartz. On solution in acid, it leaves a fine clean sharp angular quartz sand.

Captain FRANKLIN describes a calcareous conglomerate near Jabalpur as composed of rounded fragments of wacken, basalt, sandstone, quartz, and fine sand, cemented by calcareous matter, and resembling calcareous sandstone. Its stratification is always horizontal, and it occurs in the beds of most rivers whose sources are in trap countries: he supposes it to be formed from the detritus of sandstone and overlying rocks, reposing on primitive rocks, and covered with 30 feet of alluvium; but it is doubtful whether his account includes the present rock, which seems to extend for a great distance in each direction underlying the basaltic trap.

From Q to P occurs the ledge in this rock before noticed, marking the former position of a coast. At O, a small water course between other hills, is a conglomerate containing pebbles of red jasper, basalt, felspar, &c. united with silicious cement. At H a similar variety occurs, and veins of brown silex are frequent in the limestone.

Above the ledge L is a continuation of the same limestone, which towards La becomes a bone breccia, and at Lb is much broken and mixed, from the protrusion of a basaltic vein at M. S is the platform covered with a kind of gravel, on which Captain SLEEMAN first discovered the fossil bones: it was evidently part of the lacustrine bed previous to the denudation of the lower valleys and the present Nerbadda plain.

G is a stratum of compact basalt, conformably stratified and overlying the limestone on the three hills; whence it may be concluded to have been

once continuous over the whole space. The sketch does not pretend to accuracy, but the height of the hill to the right is stated in round terms to be 150 feet. It would be a profitable employment for a geologist to strike a complete section across from the trap hills S. E. of Jabalpur to the sandstone range of *Pataria*, and another from *Tendukaira* to the hills south of *Narsinhpúr*, sounding through the alluvium of the valley of the Nerbadda, and so putting us in possession of the true features of this field, now becoming every day more important from the discovery of its coal, fossil wood, shells, and animals.

Description of Plate XXI. the locality of the Narsinhpur Fossil Bones.

Fig 1, the section of the bank laid bare by the gradual action of the *Omar Nadí* exhibits; first, an inclined plane, C D, marking the limit of the rise and fall of the stream, about 12 feet. Above this the bank is exposed for 25 or 30 feet in height between two ravines, which, and the surface, are covered with thick jungle. The upper part of the bank is composed of a light soil, mixed with kankar, and a number of globular kankar nodules are found in the bed of the stream, containing silicious nuclei.

A A, the rock in which the bones are imbedded, is a gravelly concrete, formed of rounded pebbles, grains of quartz, jasper, and basalt, united into a hard rock, with calcareous cement: it seems to agree with Captain Franklin's rock, which may thus prove very fertile in organic remains, while it must also be of great extent in the valley of the Nerbadda.

Fig. 2, the plan of the locality requires no explanation.

Fig. 3, is the fossil tooth alluded to in Dr. SPILSBURY's note. This tooth, according to Mr. PEARSON, is the third molar of the left side of the lower jaw of a horse, and it agrees with other fossil bones of horses in being a little smaller perhaps than the present species, but it is impossible to judge from a single bone. Fossil remains of horses are common enough along with those of the elephant, elasmotherium, hog, &c.

An elephant 14 feet in height will, according to CUVIER, have a thigh-bone 5 feet in length. It is doubtful whether any Indian elephant has been seen of that height.

P.

VI.—Report on a Collection of Objects of Natural History. By the Curator of the Museum of the Asiatic Society.

[Read 30th October, 1833.]

A valuable collection of objects of natural history having been offered for sale for Rs. 200, it was thought advisable to purchase them for the Society's museum, with the intention of disposing of the numerous duplicates to private collectors in exchange for other specimens.

Owing to the sad state in which the insects were brought, and the trouble of cleaning them, time has not been allowed to do more than put them on the table for the Society's inspection this evening, without any attempt having been made at arrangement: the same reasons apply to the shells; and will, it is hoped, be a sufficient excuse for the dromiscuous manner in which they are placed.

Locality of the Narsinhpur
Fossil Bones.

Fig 1.



Fig 2.



Bone matrix

Fig 4.



Fig 3.

On the very cursory inspection, however, which has been made, it appears that there are several new forms, both of the insects, and of the shells. Of the former, among the Coleoptera, the specimens of the families, of which *Lucanus*, *Cerambyx*, and *Curculionidæ* are the types, are numerous; and some of the species very extraordinary and beautiful: of the Lamellicorn Beetles, there are but few, consisting chiefly of the *Cetoniadæ* and *Dynastidæ*: of the Serricornes, *Buprestis* and *Elatér* are the only genera; whilst the collection is remarkable for the few specimens of that numerous family comprising the genus *Carabus* of Linnæus.

Of Orthoptera, the species are few; but among them are two specimens, unfortunately both mutilated, of the celebrated leaf insect from Sylhet.

The Hemiptera are numerous, consisting chiefly of *Pentatoma* and its affinities.

Of the order Omoptera, the genus *Cicada* and its affinities have many specimens, some of which appear to be new.

The Lepidoptera are all more or less injured. Some of the butterflies, however, are very beautiful, and may be preserved until better specimens shall be procured. The same may be said of the moths: and there are some species of the genus *Atlas*, one of which is of large size being $9\frac{3}{4}$ inches from tip to tip of the wings; and another, believed to be as yet unknown.

The collection of shells consists chiefly of the Phytiphagous section of the Trachelipodous Mollusca; some few belong to the Zoophagous section of the same order; one genus comes under the class Conchifera, and one is placed in the section Hydrobranchiæ of the Gasteropoda. In all there are about 22 different genera; and at least 60 different species, comprehending between 6 and 7 thousand individual specimens.

Among these, some of the species of *Caracolla*, *Cyclostoma*, *Melania*, and *Paludina* are especially remarkable. There is also one species entirely new, of a genus first described by Mr. BENSON in the first number of the Journal of the Asiatic Society, for January 1833, under the name of *Pterocyclos*. It has been thought proper to change that name to *Spiraculum*, for reasons which are fully detailed in a paper the author has the honour of presenting to the Society to night.

In conclusion, it may be remarked, that the collection is one sufficiently interesting and valuable, perhaps, to secure a vote of indemnity for purchasing it. It is probable that on inquiry it will be found to contain many new forms, particularly among the shells: for, not possessing the kind of beauty that makes them estimable to ordinary collectors, land and fresh water shells have rarely formed any considerable part of cabinets made for shew or for sale, and are accordingly little known to, and much valued by, the naturalist.

VII.—Note on the Genus *Spiraculum*. By J. T. Pearson, Curator As. Soc.

[Presented to the Asiatic Society, and read 30th October, 1833.]

Class, MOLLUSCA, Order, TRACHELIPODA.

Section, *Phytiphaga*. Family, ——— ?Genus, *Spiraculum*.*Animal*—unknown.

Shell—discoidal, upper surface plano-convex, almost flat at the top, largely umbilicated; whorls cylindrical; mouth circular; lip thickened, reflected; last whorl a little bent downward toward the umbilicus; a shelly, projecting spiracle, or breathing-tube on the upper edge of the body whorl, where that whorl touches the preceding one.

Operculum horny; very thick; formed of several spiral layers.

A species of this genus having been found by Mr. BENSON, on the Rájmahal hills, he formed a new genus for its reception; and described both its generic and specific characters, so far as he knew them, in the first number of the Journal of the Asiatic Society. To this new genus he gave the name *Pterocyclos*, and that he was right in venturing to institute it can hardly be doubted, when its strongly marked characters are considered fully. But the discovery of another species, with additional generic characters, has rendered improper a name taken from the form of the aperture of a young specimen merely, or from a species, as it would appear, far removed from the typical one of the genus. Mr. BENSON's name, therefore, has been altered to that of *Spiraculum*, and the genus, according to characters it is now known to possess, differs from all shells that have hitherto come to the notice of the naturalist. No land shell besides it, excepting the genus *Cyclostoma*, has a circular aperture; and it is a curious fact, that, in the genus *Haliotis* only, is there any process at all analogous to the shelly tube which form so remarkable a feature in the generic character of *Spiraculum*.

For the use of this tube analogy must be resorted to in the absence of proof; and analogy justifies the supposition of its being intended for the purpose of protecting the breathing organs of the animal; while it admits of the free passage of air when the mouth of the shell is closed by the operculum. Why it should be so; why this genus, which seems to be allied closely to the second division of the *Colimacés*, near to *Cyclostoma*, should have such an apparatus, while *Cyclostoma* has nothing of the kind, though the operculum of the latter shuts up the shell as completely as can that of the former, it is not easy to say. But it is equally difficult to account for the above-mentioned genus

Haliotis being furnished with tubes or spiracles well known as so many passages for a syphon; while *Stomatella* and *Stomatia*, which in other respects so much resemble it, have none.

And yet a mere breathing hole would scarcely require to be protected by a tubular process. But there may be attached to the neck of the animal of *Spiraculum*, an apparatus similar to that described by LAMARCK as possessed by the genus *Valvata* of his *Péristomiens*;—"un filet branchial et tentaculiforme au côté droit du cou, et quelque-fois une branchie en plumet et contractile, qu'il fait sailler hors de sa cavité:" or a projecting syphon, such as carries on the respiration of the second section of the *Trachelipoda*. Thus there would be an animal breathing air yet furnished with the apparatus, or a modification of the apparatus of one inhabiting and breathing only water, and consequently occupying an intermediate place in the chain of affinity, and forming an inosculation between the two. If so LAMARCK might have adduced it, had it been known to him, as another fact, strongly confirmative of his celebrated idea of the gradual perfection of the animal form. His remarks on the subject are so apposite, that they deserve to be quoted entire. "A mesure que," says LAMARCK, "les animaux se repandirent partout de proche en proche, il parait que ceux des trachelipodes fluviatiles que habitèrent les eaux qui ont peu de profondeur, comme celles des petites rivières des étangs, et des marais, que sont exposées à tarir, furent souvent réduits à vivre dans une vase plus au moins desséchée. Ils se trouverent donc forcés à s'habituer à l'air, à le respirer. Or cette habitude ayant modifié leurs branchies, comme celles des colimacés, est devenu pour eux une nécessité; en sorte que quoique vivant dans l'eau ils sont maintenant obligés de venir de temps en temps à sa surface pour y respirer l'air libre." If any change of this kind ever did take place, it may perhaps be found at some future time, when physiological investigations are better understood than at present, that these animals are able to breathe both air and water; and further, should the above conjecture as to the respiratory apparatus of *Spiraculum* prove to be correct, there will be another link of union between the second section of *Colimacées* and the *Péristomiens* beside that of the *Lymnéens*.

Genus, *Spiraculum*. Species, *Hispidium*.

Specific Characters. Animal unknown.

Shell white, subdiaphanous, upper surface of the body whorl slightly patched with rufous. Epidermis dark-brown, covered with short bristly hairs, which at the outer and under side of the whorl are placed thickly together, giving an appearance to the shell of its being zoned with three narrow dark lines; whorls five, breathing tube one line

in length, conical, compressed, pointing backward and inward; mouth circular, lip thickened and reflected. Diameter one inch.

Operculum corneous, formed of several spiral layers, deeply cupped at the outer surface, and plano-convex at the inner.

All the specimens of this collection have the mouth dilated at the upper margin into a surface more or less flat, or concave, or formed like a sinus. But in the above description it is assumed to be circular, because it is almost of that form in the more advanced specimens, from the dilatation having become a well-marked sinus, and in one or two nearly formed into a tube. In a smaller species also, in the collection, the tube is actually formed in this manner, being at first a dilatation, then a sinus, as fresh shelly matter is deposited, and finally a tube: and in proof of this, a series of specimens may be seen in the collection, in which are gradual changes from a slight dilatation of the upper margin of the aperture, to the perfect tube and circular reflected lip.

2.—*Spiraculum Parvum*.

Shell white, subdiaphanous, zoned with a dark-brown line along the circumference of the whorl, striated above with brown zig-zag striæ, and less distinctly so below. Shelly spiracle or breathing tube situated near to the mouth. Mouth perfectly circular; lip thickened and reflected, umbilicus largely dilated, upper surface plano-convex, almost flat. Diameter $\frac{6}{10}$ of an inch.

Operculum unknown, supposed to resemble that of *S. Hispidum*.

Epidermis dark-brown.

3.—The shell described by Mr. BENSON under the name of *Pterocyclos rupestris*.

It is thus ascertained that there are at least three species of this interesting genus, and it is hoped that the reasons detailed above are an excuse sufficient for changing the name bestowed upon it by Mr. BENSON; at all events, it has been done from a sincere conviction of its necessity, and not from any spirit of innovation.

VIII.—On the *Kukumb ka Tel*, or Concrete Oil of the Wild Mangosteen.

To the Editor of the Journal of the Asiatic Society.

SIR,

The motto on the title page of your Journal induces me to send you a few remarks on a substance which I have reason to think possesses some very peculiar properties, which entitle it to be made the subject of experimental investigation.

This substance is the *Kukumb ka Tel* of the natives of this part of the country, or the concrete oil of the wild mangosteen, a tree which is common in some parts of the Southern Konkan. I am not aware, whether any or what difference, further than may be induced by cultivation, exists between the above and the much-extolled mangosteen of the Straits. The fruit ripens in April and May; is small, and of a flattened globular form. The rind or shell is about $\frac{1}{8}$ th of an inch in thickness, of a deep crimson colour, and intense acidity. Within this, but without adhering to it, is contained a pulpy mass, in which the seeds are imbedded. The oil is extracted from the seeds by boiling. They are first exposed for some days in the sun to dry, and then pounded and boiled in water: the oil collects on the surface, and on cooling concretes into a solid cake. When purified from extraneous matter, the product is of a rather brittle quality; of a pale yellowish hue, the shade inclining to green; exceedingly mild and bland to the taste, melting in the mouth like butter, and impressing a sensation of cold on the tongue, not unlike what is experienced on allowing a particle of nitre to dissolve on the tongue.

From several experiments on this substance with the thermometer I have been led to the conclusion that in passing from the concrete to a fluid state, and conversely from a fluid to the concrete form, it is guided by some peculiar law, in consequence of which it has two distinct temperatures, removed from each other by several degrees, at which it passes respectively from one state into the other. I need not here detail the numerous trials I made on it, as the general result was the same in all. My first object was to ascertain the temperature at which it congealed or passed into the concrete form. This from repeated trials I invariably found to be about 90° . In one instance, having brought the substance into a perfect state of fluidity, I placed it in an oven with a temperature at first above 100° , but allowed gradually to descend. When the Thermometer, which was placed beside it, indicated 88° , I expected to have found it congealed; but perceiving that it still retained its fluidity, I took it out and plunged the bulb of the thermometer into it. The thermometer immediately rose to 94° , at which it continued for some minutes, (the external air at the time being 72° ,) and then gradually descended to 90° , at which it became stationary for some minutes before the substance began to lose its fluidity and transparency: then without indicating any change of temperature, the process of congealing commenced at the sides of the vessel, the opaque cloud slowly creeping in towards the centre, and the thermometer all the while remaining at 09° .

The result of various trials satisfied me, that this substance could not be brought to congeal at a higher temperature than 90° ; but in experimenting on it in the solid state, that temperature was found quite insufficient, by several degrees, again to liquify it. The following is a brief statement of the result of several trials to ascertain its melting point. It was subjected to a gradually increasing temperature, commencing from 90° , with considerable intervals between every higher accession of temperature, to allow time for the effect which was capable of being produced on it. From 90 to 100° , the effect was merely to soften it: at 102° , it still preserved its cohesion, but the consistency was that of butter in warm weather: at 106 part began to separate in a semifluid state, transparent at the edge and opaque in the centre; and a few minute globules were separately observed in a perfectly fluid state. Every fresh accession of temperature had of course the effect of bringing it more and more towards a state of fluidity; but up to 116° , there was still observable a partial opacity, and it was only when the temperature had reached about 120° , that it could be said to have attained perfect fluidity and transparency*.

Another peculiarity in this substance is the irregular form its surface is thrown into in the act of concreting. Nor does it appear capable of being prevented by any management, or by conducting the process in the most gradual and gentle manner. But the effect may be considerably increased by exposing it in a fluid state to the sudden application of a cooling medium. Having a stratum of the fluid-oil at 120° , floating on water in a small cup, I suddenly exposed it to the chilling influence of a slight drizzling rain and sharp breeze, the temperature of the air being 70° : the rapid abstraction of heat soon caused the congealing process to commence, and the entire surface shot up into a series of prismatic or columnar masses, about $\frac{1}{8}$ th inch in height, and separated from each other by small intervals. This effect took place some time before the substance became perfectly opaque; and while in this state, it had the appearance of a crystallized body, in an intermediate state between opacity and transparency, of which we have a familiar instance in a piece of loaf-sugar dipped in water.

The concrete oil of the mangosteen might I apprehend be advantageously introduced into pharmaceutical preparations. It is used by the natives as a healing application. I have noticed among its sensible properties, that it impresses a sensation of cold on the tongue; from which it would appear, that it powerfully absorbs heat, as several salts do in the act of dissolving. It is easy to conceive that this

* The same peculiarity is observable, more or less, in all the concrete oils: it is probably owing to their bad conducting power.—Ed.

property may often be of great service in wounds or sores, accompanied with inflammation, which it is desirable to abate.

The quantity of the concrete oil that may be obtained from the seeds may be taken at about one-tenth. From $\frac{1}{3}$ lb. avoirdupois or 3,500 grs. of the seeds, I obtained 360 grs. of the concrete oil in a moderately pure state. The above is somewhat more than 1-10th; and with better management, the product might perhaps be greater. It requires however long-continued boiling to extract it, and it is still more tedious to purify it from the fibrous matter of the seeds.

Western Ghauts, 25th September, 1833.

N. N. L.

IX.—*Note on the Coal discovered at Khyúk Phýú, in the Arracan District.*

[Read, 30th October, 1833.]

Lieut. FOLEY has been most active in investigating the mineral resources of this almost impenetrable country, where swamps and jungles of the worst description render it hazardous to reside, while they hide for the most part the features by which a geologist is enabled to direct his researches.

The seam of coal discovered at *Syneg Kyong*, as shewn in Captain MARGRAVE's sketch, Plate XIX. Fig. 3. is most conveniently situated for exportation, should it turn out abundant, and of good quality. The *Oong Kyong** creek (reed-nala) falls into *Khyúk Phýú* harbour, just beyond the anchorage of the ships, and the nala itself is deep enough for all small vessels. The following description of the place is extracted from a note by Captain MARGRAVE.

“The hill towards the creek describes the segment of a circle, is very steep, and no more I think than 50 or 60 feet from the sea level; the soil is sand and clay, variously proportioned, of grey, yellow, and sometimes a reddish colour, resting apparently on coarse grey sandstone. It is isolated by the spring-tide, whose fall leaves exposed a flat level ledge of rock, (extending some 70 yards or more N. W. of the hill,) composed of grey sandstone with a brick-red tinge on the surface, particularly near the edges of the blocks and fissures. This sandstone seemed to me to disappear under the hill, for on the other side I found precisely similar stone in fragments, but not the same perfectly horizontal bed. The vein of coal runs about E. and W. (along the line DB) across the southern part of the ledge; at B is the pit sunk by Lieut. FOLEY, 3 or 4 feet deep, on a former visit: at A and C are the smaller excavations whence came the best specimens of ore and coal. The vein is not straight, however, but rather serpentine, or

* In the plate this has been called *Syneg-kyong* by mistake.—ED.

zig-zag from D to B, where it disappears, apparently passing under the hill. The seam is nearly vertical, from 80° to 85° dipping to the north. The order of the strata from the north was—1, the reddened grey sandstone; 2, a black or dark-grey sandshale, mixed with thin veins and grains of coal; 3, the hard brittle shining jet coal, sometimes covered with a yellow argillaceous substance, with layers of the sandstone and fibrous bituminous shale; then came the pure coal, succeeded below by the same mixed substance, and this followed by a hard grey sandstone. We followed the vein down as well as our imperfect means would permit, but lost it always I think at the depth of 2 or 3 feet. Including the soft layers it was generally from six inches to a foot in thickness, and could be distinctly traced from D to B by the blackish grey appearance of the stone. My attention was most excited however by the abundance and apparent purity of the iron pyrites, which was extracted during such imperfect operations.”

Lieut. FOLEY subsequently extracted a considerable quantity of the *Syng Kyong* coal, and of the curious silicified coal found here and elsewhere in contact with it*: some of the latter specimens are almost wholly converted into siliceous, and give an insight into the process of formation of the fossil wood so common in Arracan, Ava, and Assam. As to the denomination of the *Khyúk Phyú* coal, whether it be what used to be called a true coal or a more modern lignite†, it is of little importance now that all such formations are attributed to a similar origin, namely, the gradual deposition of vegetable matter along with the sedimentary sands, and mud of an ancient river or estuary. It is the extent and thickness of the bed which is of importance, and in this the *Syng Kyong* coal seems to be deficient as far it has been hitherto explored. This circumstance and the quantity of pyrites may deprive it of a part of its value, although it is otherwise of a very rich and good quality, and well adopted for getting up boiler heat. The analysis of the larger specimens sent through Mr. H. WALTER, Commissioner of Arracan, being more accurate than that noted at a former meeting, is here repeated.

Syng Kyong coal.	Oogadong lignite.	Silicified coal with ditto.
Volatile matter....	63.0	3.2
Carbon.....	35.5	4.3
Red ferruginous ash, 2.4	1.5	0.0
Siliceous.....		92.5
<hr/> 100.0	<hr/> 100.0	<hr/> 100.0

* This appears to be the case in a specimen marked No. 5, *Phúringu* coal, which is of the same nature as the silicified coal which accompanied Mr. WALTER's specimens of *Sandowy* lignite, and is stated by him to exist in such abundance there.

† See page 606. of the present number.

Lieut. FOLEY describes the *Oogadong* and silicious or *Phúringú* beds of coal as follows :

2. The *Oogadong* coal (See. Pl. XIX.) occurs in what geologists would call the newest flætz trap formation : it consists of pitch-coal, brown coal, and a slate coal ; it is found in conjunction with iron pyrites beneath a stratum of sandstone, &c. similar to that of *Syng Kyong*. The vein appears to run from east to west, extending from the foot of a small hill towards the sea.

3. The *Phúringú* bed is apparently a continuation of the last, lying in the same direction, at the distance of two coss, though separated by the sea. It crops out from between layers of a fine greyish sandstone, in a small island, one of the "*Balúngahs*," or broken islands : the beds are nearly horizontal, dipping slightly towards *Oogadong*.

Lieut. FOLEY also alludes to the plentiful supply of coral lime along the coast, and in Ramree Island, where there is a loose calcareous rock forming low hills in the direction of Moira, probably formed from the degradation of the coral.—There are mud volcanoes in Ramree as in Cheduba*, which spout out abundance of pyrites and kidney iron ore. A crater of this kind is pointed out at *Oogadong*, where scoriaceous matter, trap minerals, and basalt shew evidence of more active volcanic agency in times past. Petrified wood occurs also near Nagadong.

J. P.

X.—Analysis of Books.

Transactions of the Batavian Society of Arts and Sciences, Vol. XIII.

The half of this volume is occupied by a subject, we may say, of interest to every individual in the world ; Cholera Morbus. Important however as it may be in itself, it has now been the subject of so many volumes, treatises, and essays, that each singly conveys but little information that is new, and the greatest part of any one is a repetition of the others. Unfortunately also it cannot be said that all the labours of medical men have advanced our knowledge respecting this formidable disease much beyond what it was in the first year of its appearance. It would be difficult to name a subject in Pathology which medical men have ever so heartily and so strenuously united to investigate, and on which such a mass of intellect throughout every quarter of the world has directed its concentrated energy, and yet after sixteen years of unwearied observation, experiment, and research, we are obliged to confess that the cause of Cholera is unknown, its pathology inscrutable, and its treatment totally unsettled.

These reasons might be supposed sufficient to induce us to pass over very briefly the articles on Cholera in the present publication : as however among all the

* Nodular iron pyrites, the exterior of which has been deprived of its sulphur, and converted into red oxide of iron by heat.

opinions respecting it which have been published, those of the Dutch Physicians in the Eastern Archipelago are perhaps the least known, it may not be uninteresting to give a brief analysis of them as they appear in these Transactions.

I. The first paper is by Dr. M. T. G. MULLER, Physician to the Hospital at Wiltevrede. He sets out with an account of the several appearances of Cholera in the Eastern Islands: the first notice of it is in Bontius, Physician to the Dutch Settlement of Batavia, who published an account of the diseases of the East Indies in 1629, and among others of Cholera Morbus, which according to him was so violent, that "Cornelius Van Rayen, steward of the hospital of the sick, being in perfect health at six in the evening, was suddenly seized with the Cholera, and expired in terrible agony and convulsions, before twelve o'clock at night; the violence and rapidity of the disorder surmounting the force of every remedy." Bontius, Chap. vi.

On the news of the appearance of Cholera in Malacca in 1819, the Dutch Government of Java directed all ships coming from infected parts to undergo a strict quarantine. In spite of this, the disease broke out at Java in April, 1821, with such violence, that at Batavia, 156 deaths took place in one day, and by June it had visited every quarter of the island. The violence abated in December, by which time it is reckoned 110,000 persons fell victims to its rage.

This, it will be seen, is a very different account from that in the *Lancet*, the Editor of which is determined to maintain the contagious nature of the disease, and shapes according to that the history which he gives in the number for November 1831. He informs us that,

"In 1823, coincident with the Burmese war, and the march of our troops from sick districts in British India, the Birman empire became affected. Coincident again with the general or particular periods of the arrival of individual vessels or trading flotillas, we find the malady in Acheen, the capital of Sumatra; at Banca, Java, and Borneo, in the Philippine Islands; at Amboyna, in the Molluccas, and at length in Macao and Canton on the west coast of China."

Thus insinuating that it did not appear in Java before 1823, and omitting all mention of the quarantine.

The author then gives a summary account of the course of the disease—"A few minutes after being attacked by Cholera, the following appearances are observable. The patient lies without motion, stretched out in one posture; the skin is blue or dirty brown, and sometimes marked with livid or purple spots, as is seen in frozen persons; some times altogether dry, at others covered with cold sweat. It is cold, hard, and contracted, quite different from health, and conveys to the fingers, particularly when covered with sweat, a peculiar disagreeable sensation. The *turgor vitalis* disappears, so that even corpulent persons appear to have become lean*. The countenance falls in, and indicates great weakness; the forehead is covered with cold sweat; the eyes lie deep in their sockets, and are surrounded with a dark ring. The half shut eyelid allows only a part of the muddy eyeball to be seen, but whenever it is fully opened, the exhausted eye looks out with a melancholy gaze. The blue lips remain half open, and allow exit to cold expiration; the chest heaves laboriously, the abdomen labours to maintain the respiration. It is however tolerably even, and neither tumid nor retracted; the extremities are stiff, the skin of the half shut hands wrinkled as in persons who work much in water, but cold,

* This striking symptom appears to be unnoticed in our Medical Publications.

and the nails are blue. The patient appears almost quite indifferent to his situation, and speaks unwillingly.

"Scarcely have these appearances been observed than the scene changes. The half dead patient revives, the countenance assumes a painful expression, the legs are drawn to the belly, the feet and toes crook themselves downwards, hard moveable knoos are felt in the calves and thighs. These are the muscles drawn together by agonizing cramps. The arms are also often attacked by cramps, and the patient exhibits such strength that several persons are necessary to hold him. Oppressive sighing takes place; the cramps at length cease, but another painful phenomenon makes its appearance; the patient worn out by internal heat, cries out for cold water, swallows a quantity of it greedily, which scarcely gets to the stomach before it comes up again, generally followed by severe retchings; and in proportion as the stomach empties itself above, so the bowels empty themselves below in rapid succession of evacuations of a large quantity of thin rice-water liquid, which generally exhaust the patient, who now refuses to speak, except to cry for drink, or utter broken complaint of weakness, and groanings extorted by the spasms." Page 7.

The author then proceeds to a more minute and detailed account of the whole course of the disease, which he divides into three stages. The first, consisting of the preliminary symptoms till the appearance of vomiting; the second, from that period till the commencement of the state of torpor and insensibility; the third, from thence to death. In all this it will be seen that not the least notice is taken of the state of re-action previous to death on which the European Physicians dwell at such length; nor indeed has it been noticed by any practitioner we believe in this country. Is this state peculiar to the Cholera of cold climates, and does it constitute a difference between the disease as it occurs there and in India?

The reader must always remember that there is a certain degree of Poetry in Physic as in every thing else, and that a sick man constitutes in some respects a very picturesque object, particularly when dying of a horrible and incurable disease. Most Physicians (even the very soberest) are apt to indulge their poetical vein a little in describing the circumstances of such patients, and to make a striking picture out of the collection of their symptoms. Hence in reading accounts of Cholera, or indeed of any other fatal ailment, we must always substract a certain proportion of the terrible, and endeavour to judge of what the description would be, if written in plain prose.

Dr. MULLER then goes on to an account of the *post-mortem* appearances, which are detailed with great minuteness; he divides them into sections, the external appearances, the cranium, the thorax, the heart, the lungs, the abdomen, the stomach, the duodenum and jejunum, the ileum, the mesentery, the colon, the liver, the gall-bladder, the spleen, the kidneys, the bladder, the abdominal ganglia: of these last the author observes, that "they have been frequently examined without exhibiting any thing unusual except an increase of redness, arising from the plethora of their blood vessels, the ganglions themselves seemed unaltered." P. 39.

He then proceeds to the diagnosis, which we pass over, concluding that it can present little difficulty. The symptoms of Cholera are too formidable to be easily or frequently mistaken.

Then follow the causes of Cholera, in which however he merely confines himself to that disposition of body which renders an individual susceptible of the disease, and this in general he considers to be debility, or, to use his own words,

"It thus appears, that a weakened state of the body produces the chief predisposition to Cholera. By a weakened body, I understand a body in which the vital powers have descended below their just and necessary degree : a weak body is quite a different thing, that is, only in comparison with other stronger bodies ; a smaller degree of vital power, which may however be just and complete for the health of that individual itself." P. 54*.

He observes with respect to Europeans, that the disease does not appear in them on their first arrival in Java, but generally after they have been some time resident, and the climate has begun to affect them. He then reviews the various opinions respecting the exciting cause of the disease, and is dissatisfied with them all. He himself offers nothing better than an altered state of the atmosphere.

After an investigation of the proximate cause the author sums up thus, "A sudden and great debility of the nervous and vital powers, with increased excitement in the abdominal viscera, are the proximate causes of Cholera." P. 64.

We fear this explanation casts but little light on the disease. He then goes on to the prognosis, through all the minutiae of which, we cannot follow him ; he seems to lay most stress on the state of the pulse.

"The first and chief symptom on which any hope of recovery can be founded is the pulse becoming stronger ; it is of little consequence whether it be quicker or slower, harder or softer, if at the same time it exhibits more fulness ; nay a slight variation in the pulse is not upon the whole a bad sign, as it is generally accompanied by a diminution of uneasiness." P. 71.

We now come to what is most interesting of all, the treatment ; and this the author comprizes in four indications : first, the re-excitement and preservation of the nervous and vital powers ; second, the restoration of the circulation and the natural state of the blood ; third, the diminution of the excitement in the stomach and bowels ; fourth, the diminution of the disposition to spasm.

The means for all this the author divides into two classes, external and internal. In the first class he arranges (whether properly or not), the evacuation of blood by the lancet or leeches ; of the first he observes that it is chiefly useful to full-blooded, fresh-arrived Europeans, not yet become weak. Of the few patients cured under such circumstances, the greatest number have been bled. Leeches produce the same effects, but more slowly ; in advanced states of the disease, they remain for hours on the patient's skin without becoming fuller. He then discusses the derivantia, that is, all those means which, by exciting the skin, diminish the internal irritation. He lays a good deal of stress on simple shampooing, and then on dry friction ; he approves of the application of mustard paste† to the breast and extremities : moxa can hardly be used ; but in two instances, the author made a moxa of phosphorus, and burnt it on the spine, without any effect.

He then enters upon the external medicines ; the well known list of stimulants, alcohol, ether, oleum menth. &c : even phosphorus, he says, was tried to the extent of four grains in 24 hours, to no purpose : opium he declares to have had no visible

* It is a little odd that this should be the doctrine of the old Arabic Physicians, in what they called *Aslah-ool Amzijati laho*, by which they meant, not the best state of health absolutely, but the best state of health with reference to the constitution of a given individual. See printed Edition of the *Kanooncheh*, 1827. P. 3.

† This remedy is also highly, and we believe justly extolled by Dr. TWINING. *Practical Account of Epidemic Cholera*, 1833. P. 72.

effect on the disease : of calomel, he observes, that it was much more used formerly than now, and he ends with a list of the cholera mixtures published officially in the Batavia Courant. We select one or two of those least used with us.

- | | |
|--|-------------------------------------|
| (4) <i>R. Infus, Valerian,</i> 3v. | (5) <i>R. Calomel,</i> 3i |
| Ol. Cajapooti, 3i—ii. | Camphor. elect. . . . gr. viii |
| Æther Sulph. acet. . . . 3ii | Opii pur. gr. iv |
| A spoonful every hour. | Sacch. Alb. 3i |
| | divide in pulv. vi. |

One to be taken every quarter
of an hour.

- | | |
|--|--|
| (6) <i>R. Ol. Phosphor,</i> 3s. (3i | (7) <i>R. Aq. Menth.</i> 3 iv |
| continet Phosphor . . gr. ii) | Acet Morphii. gr. iv |
| Pulv. Gum Arab. 3i | M. as the former. |
| Aq. Menth. 3v | (8) <i>R. Ol. Jatrophe,</i> 3i |
| Vini Opii. 3i | Pulv. Gum Arab. 3i |
| M. f. emulsio | Aq. Menth. 3iii |
| as the former. | M. every hour two spoonsful. |

II. The length of our observations on this first article renders a detailed account of the succeeding on the same subject unnecessary, by H. SCHILLET, Surgeon Major of the Royal Netherland Marine. He inquires into the name of the disease, its cause, (in which he is an opponent of contagion) its effects, its species, its diagnosis, its treatment, (and here he quotes largely from the works of our Indian Surgeons, JOHNSON, CORBYN, BOYLE, TYTLER, &c.) and then the post-mortem appearances. In these he chiefly notices the state of the brain, and gives a plate of that organ, its vessels loaded with blood, and the dura mater deeply stained with inflammation. He also gives a figure of a portion of the stomach and the jejunum. In an account of the prophylactics, he takes notice of the dispute respecting the effects of bad rice in exciting the disease. "It is well known, that Dr. TYTLER connected the food of the Hindoos with this disease, and on account of the bad qualities of the last rice crop, which is their daily food, he ascribed this epidemic sickness to that ; thereupon his well-known work saw the light, endeavouring to ascribe the epidemic which has prevailed in different parts of the world, for many years, to the bad qualities of the rice, on which account he gives to the Indian cholera the name of morbus oryzeus ; bad food is doubtless one of the chief predisposing causes of this disease, but certainly not the proximate cause." P. 178.

III. The next article is a dissertation on the origin of the Japanese, by Dr. VONSIEBOLD. Like all other eastern nations, these people pretend to a divine origin and unfathomable antiquity. The race of gods, called TEWSEN SETSIDAI, had employed themselves, somewhat unsatisfactorily we should think, for millions of years in hovering over the land of NIPPON : at length the seventh in succession to the celestial throne, by name TSANAGE NAMI, with his wife, came to the resolution of descending from the clouds on Japan, and there multiplying like men, they produced a race of demigods of limited but very long life, and dignified with polysyllabic names.

European antiquarians have given various interpretations of this fable, with which we need not trouble our readers. Four different opinions are entertained respecting the origin of the Japanese :—

- A. That they are descendants of the Chinese.
- B. Or of some of the Tartar tribes.
- C. Or of a mixture of various Asiatic tribes.
- D. Or they are ahorigines.

Which last supposition cuts the knot at once.

The resemblance between the Chinese and Japanese is so strong, in physiognomy, religion, and manners, as as to have impressed all travellers with the idea of the latter people being a colony of the former.

The author omits other considerations, and enters into an inquiry respecting the oblique position of the eyes, supposed to be peculiar to the Chinese, and the nations consanguineous with them; but as he observes, nothing can be built on this till it be ascertained what are the Asiatic tribes to whom this conformation belongs, and whether any of those of North and South America partake in it. The skin of the Japanese is of all colours; in town many approach to the fairness of Europeans, in the country they are copper red or earthy clouded.

His next inquiry is into the resemblance of the Japanese and Chinese language and writing. The Chinese say, the first appearance of the Japanese among them was A. D. 57, at which time, they were harbarians, without writing, government or morals, but they at the same time assert, that Japan was peopled by a colony of Chinese in the year 1195 before Christ; if so, why did not this colony carry their writing and manners along with them? The author allows that Japanese writing is borrowed from the Chinese, but still contends, that Japan must have been peopled by a nation using a different language from theirs.

The Japanese alphabet consists of 47 letters, which are originally Chinese characters, having the same sound; but the Japanese language, unlike that of the Chinese, is polysyllabic: hence, says the author, Japan must have been peopled by some Asiatic tribe before the art of writing was spread through the northern parts of Asia.

The author next proceeds to the religion, and, "Though," says he, "I cannot prove that the religion of the old inhabitants of Japan might not have been the same with that of their Chinese contemporaries, yet I can maintain, that the religion prevailing among the Chinese and Japanese in the present day has not the least resemblance to that of the ancient Japanese." P. 220. To prove this, the author enters into a long investigation of the ancient and modern Chinese and Japanese godderies, which we have found it difficult to understand, and would find it more so to make intelligible to our readers; we shall therefore take it for granted that he has proved his point, and go on to the rest of the argument.

The author then considers the relationship between the Japanese and the Tartar races, but we have not leisure to follow him through this research, particularly, as after examining the language and manners of the Japanese and the neighbouring kingdom of Corea, at great length he does not appear to come to a positive conclusion. He then asks if the Japanese are a mixed race, composed from various Asiatic clans; and though the author is not very clear, we consider this the opinion to which, upon the whole, he is most inclined. He even considers that there is a strong relation between these tribes and the Peruvians, and gives some instances of verbal resemblances in their respective language, thus supporting the theory of Mr. RANKEN on the origin of the Peruvians. He concludes, "I commit these fragments to the hands of the literati, earnestly entreating them to receive

with favour the nosegay I have gathered with so much care from the islands of this archipelago and the neighbouring continents, and to take them under their *high and mighty protection*." P. 275.

IV. The next paper by M. H. HALEWYN is *an account of the tribe called the Dayakkers of Borneo*. They seem in a very low state of civilization, being totally ignorant of reading and writing, and have a number of very peculiar customs well worth noticing, did our space allow of it. We shall only notice one, which will serve as a complete refutation of those who are disposed to hold Oriental civilization in low estimation. "The Dayakkers are governed by their chiefs, who are entirely dependent on their subjects, and are chosen from the eldest of the people. If the chief acts arbitrarily, the people rebel against him and put another in his place." P. 291. This it must be confessed is the very acme and beau ideal of government, sufficient surely to satisfy the most liberal reformer. How wonderful it is that so perfect a scheme should, in the midst of the march of European intellect, be reserved for such a remote and unnoticed part of the world as this. "There are," proceeds the author, "many debtors in *Dayak*: the custom is, that if the debt be not discharged in four months, it is doubled." P. 291. This is worse than Calcutta Sircars and Life Insurances yet.

V. The next article by Mr. VANDER JAHT is *an account of the groupe of islands called the Kokos or Keeling Islands*, of which a full and authentic account, derived from the Reports of Admiral OWEN to the Government, was published in the GLEANINGS OF SCIENCE, for Oct 1830. The article terminates with an account of the interview between the author and Mr. ROSS, also given in the GLEANINGS.

VI. The last article is *an account of the mountains of Tinger, in Java, by H. T. DORNIS, Resident at Soorabay*. The author examines their geographical situation, the dwellings of the inhabitants, their religions, their mode of prayer, their festivals, their ceremonies of birth, marriage, and funerals; all these seem borrowed from the Indian Brahmins, and are quite different from the Muhammedan Javanese. Above the head of BRAHMA, VISHNU, and SIVA, however, they acknowledge a supreme power, whom they call PRABO GORO INGLOHOR. One or two singular customs may be noticed—"widows are highly prized among them, and as soon as a woman has lost her husband she is sought after by almost all the bachelors; a young miss gets a husband with great difficulty." P. 330. One might be tempted to ask how then are widows produced? The case is similar to WINIFRED JENKIN'S puzzle as to how sheep's heads could be found in Scotland unless there were sheep too. "When the Tingerians wish to exhilarate themselves, they drink *tocak*, i. e. fermented palm wine, mixed with water, which renders them immensely frolicsome; the smoking of opium and drinking of strong waters is unknown." Ibid. We know not whether the Temperance Societies would approve this distinction.

On the whole, the author is so delighted with the climate and manners of the Tingerians, that he breaks out into a Virgilian rapture, which not to do him injustice, we shall give both in the original and translation as a conclusion to our analysis. "Gelkkige bewoners van Tinger! hoe weining gevoelt gij misschien zelve het vo oregt hetwelk geniet!"

"Happy inhabitants of Tinger, how little perhaps do they feel the privileges which they enjoy."

XI.—Miscellaneous.

1.—Register of the Temperature of Ghazipur. By the Rev. R. EVEREST.

I am fully aware how imperfect these observations are, but in this country, where so little has been done, I publish them in the hope they may hereafter be of use to individuals engaged in the same pursuit. To obtain the mean of every hour in the 24, as was done at Leith, is beyond the power of any one without assistance.—R.E.

in 1831-2					in 1832-3.				
	Sun- rise.	½ past 2 P. M.	Mean.	Mean range.	Sun- rise.	½ past 2 P. M.	Mean.	Mean range.	
1831.									
April, . . .	Highest, ..	86	111,1			78	110,6		
	Lowest, ..	70	93,5			62,5	85		
	Mean,	76,9	99,2	88,05	22,3	72	98,4	85,2	
May, . . .	Highest, ..	90	111,6			81	112,5		
	Lowest, ..	81	95			69	97		
	Mean,	86	109,5	97,75	23,5	76,2	107,6	91,5	
June, . . .	Highest, ..	87,5	111,2			84	115,5		
	Lowest, ..	77	79			75	81		
	Mean,	82	97,6	89,8	15,6	80,6	102,2	91,7	
July, . . .	Highest, ..	82,5	103,5			83,5	106,5		
	Lowest, ..	75	85,5			75	82		
	Mean,	80,6	94,1	87,35	13,5	80,7	94,8	87,75	
August, ..	Highest, ..	81,5	96			83	100,5		
	Lowest, ..	77,5	79,7			77	81		
	Mean,	79,7	89,1	84,6	9,4	79,2	91,1	85,15	
September,	Highest, ..	82,5	98			80,5	99		
	Lowest, ..	73	80,5			72	82,5		
	Mean,	78,3	90,1	84,2	11,8	76,9	91,7	84,3	
October, ..	Highest, ..	78	94			76	94		
	Lowest, ..	59,5	85,5			63	73,5		
	Mean,	70,5	89,9	80,1	19,4	70	78,5	79,2	
November,	Highest, ..	72,5	88,5			65	90		
	Lowest, ..	46,5	74			51	80,5		
	Mean,	53,2	79,1	66,25	25,9	56,7	84,4	70,5	
December,	Highest, ..	65	70,5			63	88		
	Lowest, ..	46	63			38	66,5		
	Mean,	55,4	67,9	61,65	12,5	50,3	74,5	62,4	
1832.									
January, ..	Highest, ..	53	77,5			57	83		
	Lowest, ..	39	62,5			37,5	68		
	Mean,	45,3	68,4	56,85	23,1	47,1	75,5	61,3	
February, ..	Highest, ..	60	76						
	Lowest, ..	41	70,5						
	Mean,	50,7	73	61,85	22,3				
March, ...	Highest, ..	66	94						
	Lowest, ..	47,5	77						
	Mean,	55,5	84,2	69,8	28,7				
Yearly means,			77,36	19,0					

Radiation.—I also made a few experiments on Radiation towards the latter end of the year 1832. The Thermometer was covered with black wool, and laid on the grass. The following are the results :

Sept.	A. M.												P. M.											
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
28	137.5	..	144.5	140	..	126	103	..	81	..	..	..	..	73	
29	72.5	..	70	70	68.5	69.5	80	94.5	108	131	140	140	138	132	122	106	93	82	77.5	76	74	72.5	75	74
30	70.5	71	..	..	106	129	138	140	135.5	129	119	..	..	82	78	..	..	..	..
Oct.	1	..	..	..	..	70.5	..	..	..	..	..	140	..	..	119	..	..	..	..	..	79	..	..
2	74	..	..	..	..	..	142	141	..	..	..	..	..	..	..	..	..	..
3	75	..	..	..	..	..	..	142	..	..	..	..	..	..	..	..	79	..	..
4	76	..	..	..	..	..	71.5	
5	73	..	..	..	..	..	..	..	..	120	..	..	..	..	..	..	76	..	..
6	73	..	..	..	..	..	..	..	..	128	..	..	..	..	..	..	75	..	..
7	75	..	..	..	..	..	..	129	..	101	..	..	..	..	..	..	72	..	..
8	71.5	..	..	..	..	..	72	..	..	..	..	..	..	..	..	..	..	..	..
9	67.5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
10	62.5	..	..	..	..	..	..	..	..	128	..	..	..	..	..	..	..	..	64	
11	60	59.5	..	..	..	..	..	132	..	..	..	..	..	..	..	..	62	..	..
12	57	..	..	..	..	..	..	138	..	..	..	..	..	..	..	..	64	..	..
13	137	..	..	..	..	..	..	..	..	68	..	..
28	59	..	..	..	..	..	..	124	..	102	..	..	..	..	..	..	65	..	..
31	60	..	..	..	..	..	132	130	..	124	..	..	..	..	..	..	66	..	..

I subjoin, for the sake of comparison, the height of a Thermometer suspended in the shade, during the above days.

1832	A. M.												P. M.											
Sep.	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
28	72	90	..	86.5	83	80
29	76.5	..	76.3	75.5	74.8	75.5	78.3	80.5	83.5	86.6	89.2	92.1	93.5	88.5	87.7	86.1	85.5	83	81	79	78	78.4	78	
30	75.5	75.3	..	..	..	86.8	90	92.3	95.5	..	90	..	..	83	81	..	..	..	..
Oct.	1	..	..	..	76	76	..	..	..	..	..	..	..	94	..	..	..	..	..	80	..	..	..
2	77.5	..	..	..	..	..	..	94.5	..	..	..	..	..	..	..	82.5	..	..	..
3	77.5	..	..	..	..	..	..	96.8	..	..	..	..	..	..	..	..	82.5	..	..
4	78	..	..	..	..	..	..	..	..	88.5	..	..	76	..	..	..	..	73	..	
5	74	..	..	..	..	..	..	..	..	88.5	..	..	..	..	..	76	..	..	..
6	74.2	..	..	..	..	..	..	..	..	90.5	..	..	..	..	..	76	..	..	..
7	75	..	..	..	..	..	..	87	..	84	..	..	..	..	..	74	..	72.5	..	
8	71.5	..	..	..	..	..	..	..	..	90	..	..	..	..	..	..	77.5	..	..
9	71.5	..	..	..	..	..	..	..	..	93	..	..	..	..	..	..	..	..	..
10	68.5	..	..	..	..	..	..	..	..	93.5	..	..	..	..	..	79.5	75.2	..	..
11	66	..	..	..	..	..	..	..	..	92	..	..	..	..	..	..	..	..	..
12	63	..	..	..	..	..	..	..	..	92	..	..	..	..	..	60.5	..	..	..
13	68.5	..	..	..	..	..	..	..	..	93	..	..	..	..	..	..	..	..	..

2.—Note on the Saldjít of Nipal.

To the Editor of the Journal of the Asiatic Society.

DEAR SIR,—I have been much gratified and interested by reading Mr. CAMPBELL'S paper on the native alum, or *Saldjít* of Nipal. I think it is more than probable, that if an average sample of the various qualities were collected, and subjected to analysis, the general result would be what Mr. C. has advanced, viz. about 66 per cent. of sulphate of alumina. As I had only one quality to operate upon when I made my analysis, why it was "HOBSON'S CHOICE" with me. From the information I could gather from Nipal merchants, I am led to believe, that Mr. C. is perfectly correct as to the quantity that may be collected.

But what I am now going to state, may set the matter beyond a doubt. I have seen the organic remains of an ammonite (*Ammonites sacer* of SOWERBY) imbedded in alum shale from the banks of the *Gandak* river in its early course. This perfectly agrees with specimens (now in my possession) which I formerly collected at the alum works on the Yorkshire Coast to the north of Whitby. This fact I think clearly proves the existence of alum shale strata in the secondary formations at the foot of the Himálya range, and that it may extend through the hills of Nipal. I also concur with Mr. C. relative to the tedious and expensive processes attending the manufacture of alum at home; so much so, that the return has scarcely equalled the outlay. A friend of mine knows this to his cost.

I have no doubt but European skill and capital will shortly turn to some account these notices of a native, and valuable substance, which has not remained bidden, but has been at least unknown to the generality of enterprising commercial men.

In conclusion, should this meet the eye of Mr. CAMPBELL, I beg leave to thank that gentleman for his kind offer of assistance, and will feel obliged by his sending me samples, or specimens of the various kinds of *Salájit*, especially the black kind, a variety which I have not yet seen. Any expense in collecting, or conveyance to my address, (Singhea, Tirhoot,) will be cheerfully paid.

I am, dear Sir, &c.

10th Nov. 1833.

J. STEVENSON.

3.—*Summary Sketch of the Geology of India.*

[Extracted from the Rev. W. D. Conybeare's Report to the British Association at Oxford, 1882.]

In Southern Asia, many of the British residents have been far from inactive; among these we may specify the names of FRANKLIN, VOYSEY, HERBERT, CHRISTIE, LOW, HARDIE, and GOVAN: but CALDER's General Memoir on the Geology of India conveniently and ably brings together in one view the substance of the insulated observations of others.

From these sources we learn, that primitive formations, in which granitic rocks bear the principal proportion, occupy not only the great Himálayan northern chain, but also three-fourths of the entire peninsula, from the vale of the Ganges below Patna to Cape Comorin; although these rocks are frequently overlaid by a thin crust of laterite (a ferruginous clay, considered as associated with the trap formation). The transition formations have not been clearly distinguished; the secondary formations described are:—1. The carboniferous group. Coal has been said to occur extensively in the grits bounding the southern slope of the Himálaya; but it has been questioned, whether this formation is the older coal, or only lignite associated with nagelfluë, (as on the slope of the Alps;) it has been particularly described however where the river Tista issues from this chain (88° 35' Long. E.), and there undoubtedly bears all the characters of the older formation; its strata are highly inclined, whereas the tertiary beds, and even most of the secondary in this part of India, are horizontal: but the only coal district regularly worked is that on the river Damúda, about 100 miles N. W. of Calcutta; this extends on the banks of that river about 60 miles, and appears from its fossil *lycopodia* to be undoubtedly the older coal; it reposes apparently on the surrounding primitive rocks, but it has been conjectured, that it may possibly extend across the delta of the Ganges to Silhet (almost 306 miles distant at the eastern extremity of Bengal); it seems doubtful however whether the Silhet coal be not really modern lignite, as tertiary rocks certainly prevail in that quarter. No carboniferous limestone has been observed.

2. Next to the coal we have to notice a great sandstone formation, which is usually considered equivalent to our new red sandstone; this includes many variations of character, comprising, besides sandstone and conglomerates, shales often approximating to older slate; the diamond mines of Panna (in Bundelkhand) and of the Golconda district are situated in this formation, the matrix being a conglomerate bed with quartzose pebbles: rock salt and gypsum are found where this formation extends on the N. W. into the great basin of the Indus: the stratification is uniformly horizontal: no organic remains occur. Beginning at the Ganges

on the east, this formation first shows itself, supporting basalt, on the Rajmahal hills ; it again prevails throughout the interval between the confluences of the river Són (Soane) and of the Jamna with the Ganges, and thence stretches across W. S. W. through the Bundelkhand district to the banks of the Nermada (Nerbudda), which flows into the Gulf of Cambay, as far as 79° Long. E. ; where it is overlaid by the eastern extremity of the great basaltic district of North-western India near Sagar : the red sandstone shews itself again emerging from beneath the north-western edge of this basaltic district, at Nimach, near the western sources of the Chambal (the great southern branch of the Jamna) and at Bang, in the valley of the Nermada. In both places, as also along the central portion of the platform before described, stretching through Málwa, it is frequently covered with a thin crust of grey argillaceous limestone, supposed to represent our lias, but nearly destitute of organic remains, although a single gryphite is said to have been found. The general absence of organic remains in the secondary rocks of India is remarkable ; but Mr. VOYSEY mentions an argillaceous bed full of fossil shells (species not stated) beneath the trap of the Gáwilgarh hills (between the confluences of the Tapti and Purna, in the Berar district :) the same lias-like beds occur with the red sandstone of the Golconda district. A primitive range, extending from near Delhi to the head of the Gulf of Cambay, separates the secondary rocks of Málwa from those of the great basin of the Indus ; but on the western borders of this ridge through Ajmír, the red sandstone again shews itself, containing rock-salt and gypsum. The whole of this immense basin appears to have been hitherto geologically neglected, although it would probably best repay such an examination, for here if any where in India, we might most probably expect a fuller series of secondary rocks. Mr. GOVAN has observed at the very source of the Satlej, one of the chief tributaries of the Indus, amid the highest primitive peaks of Himálaya, a small basin of secondary limestone, containing ammonites and cardia.

3. Tertiary rocks at the foot of the first rise of the primitive rocks of the Himálaya, in the north west of Bengal, where the Brahmaputra issues from them at the pass of the Garrow hills ; *cerithiæ*, *turritelli*, remains of lobsters, sharks, crocodiles, &c. are here found, and further east, *nummulite* limestone prevails at Silhet. The soil throughout Bengal is often occupied by deposits of clay, containing concretionary lumps of limestone, called *kankar* ; this, which affords the principal supply of lime in India, is probably of very recent origin. It remains only to notice the great basaltic district of the north-west. This extends from Nagpur, in the very centre of India, to the western coasts between Goa and Bombay, occupies the whole of that coast to its termination at the Gulf of Cambay, and thence penetrates northwards as far as the 24th parallel of north latitude.

In the Burmese Empire we find primitive rocks in the chains above Ava, but tertiary beds, with the characteristic shells, in the valley of the Irrawady, near Prome ; also remains of the mastodon, &c. in the diluvial gravel. West of this the whole chain of the Malayan peninsula is primitive, consisting principally of stanniferous granite.

I believe that the above, condensed as it is, will be found the fullest general account of the progress as yet made in Indian geology, hitherto presented to the public.

Meteorological Register, kept at the Assay Office, Calcutta, for the month of November, 1833.

Day of the month.	Barometer reduced to 32° Fahr.				Thermometer in the Air.				Depression of moist-bulb Thermometer.				Hair Hygrometer.		Rain.	Wind.		Weather.	
	At 4 A.M.	At 10 A.M.	At 4 P.M.	At 10 P.M.	Minimum at 4 A.M.	At 10 A.M.	Max. by Reg. Ther.	At 4 P.M.	At 10 P.M.	At 4 A.M.	At 10 A.M.	At 4 P.M.	At 10 A.M.	At 4 P.M.	Inches.	Morning.	Noon.	Evening.	
1	.875	.922	.910	.975	71.2	79.9	89.8	84.0	74.3	4.1	8.9	12.5	7.0	86	76	clear.	clear.	clear.	
2	.939	.980	.960	.958	72.5	80.1	90.0	83.8	75.0	6.2	8.0	12.3	8.7	87	75	do	do	do	
3	.913	.976	.978	.993	74.4	81.3	93.1	83.2	75.6	4.7	7.7	10.9	6.6	86	82	do	do	do	
4	.886	.961	.953	.922	72.0	80.9	94.8	84.4	78.1	5.0	7.6	10.5	7.6	86	81	do	do	do	
5	.902	.919	.960	.940	73.1	81.3	88.5	83.8	78.6	2.5	6.0	9.4	5.4	91	84	do	do	do	
6	.976	.922	.903	.953	74.5	80.0	89.0	83.4	77.8	1.6	6.0	8.8	4.7	91	83	do	do	do	
7	.912	.961	.962	.929	76.5	80.0	90.4	83.6	77.2	8.7	6.7	9.2	7.7	80	82	do	do	do	
8	.918	.911	.921	.999	73.1	81.1	94.0	83.7	75.0	3.1	7.5	10.7	6.0	88	80	do	do	do	
9	.994	.961	.953	.907	71.8	80.4	95.0	83.3	76.8	4.0	7.4	11.7	9.3	87	80	do	do	do	
10	.997	.964	.901	.951	71.4	81.2	87.2	82.5	75.4	4.4	9.0	10.3	4.2	85	85	do	do	do	
11	.902	.932	.905	.954	73.1	80.5	90.8	80.0	73.0	5.4	7.5	7.5	5.8	89	88	do	do	do	
12	.933	.909	.979	.915	68.0	78.1	92.0	81.6	76.9	3.6	7.0	10.1	7.5	87	82	do	do	do	
13	.938	.932	.940	.986	70.4	79.7	89.5	82.0	75.0	3.4	8.5	11.7	8.6	84	78	do	do	do	
14	.903	.900	.889	.913	71.0	79.0	89.8	82.1	76.8	5.3	6.6	10.7	8.1	88	81	do	do	do	
15	.897	.964	.863	.925	72.0	78.9	90.0	81.4	74.3	5.2	6.5	9.2	6.3	88	84	do	do	do	
16	.918	.909	.901	.956	71.3	78.6	90.0	81.4	77.0	3.3	6.4	9.0	7.0	89	84	do	do	do	
17	.920	.921	.932	.940	73.0	79.0	91.0	80.4	74.0	4.0	6.0	7.0	7.1	90	88	do	do	do	
18	.925	.926	.905	.982	74.2	78.4	89.0	82.5	78.5	3.6	6.4	11.5	7.5	90	79	do	do	do	
19	.976	.932	.959	.993	70.1	79.0	88.0	81.7	71.2	4.1	9.5	11.2	5.8	82	79	do	do	do	
20	.902	.968	.946	.964	70.0	80.0	90.0	81.5	73.4	4.0	6.8	10.3	6.7	88	82	do	do	do	
21	.968	.975	.899	.923	70.0	80.0	90.0	81.5	73.4	3.5	7.8	10.0	3.8	86	82	do	do	do	
22	.918	.980	.871	.947	70.2	81.3	87.4	84.0	74.2	0.5	6.4	9.0	2.2	85	85	do	do	do	
23	.952	.931	.921	.903	74.5	77.0	91.2	82.0	73.0	1.8	4.4	10.1	5.0	93	81	do	do	do	
24	.955	.956	.955	.908	67.0	77.8	90.0	80.5	73.2	2.6	5.7	10.0	5.7	90	80	do	do	do	
25	.970	.955	.958	.931	70.0	76.4	88.0	81.1	70.2	6.2	6.7	11.5	5.2	87	77	do	do	do	
26	.918	.976	.968	.948	67.8	75.5	85.0	81.0	74.2	3.8	6.0	10.5	6.2	90	80	do	do	do	
27	.914	.987	.971	.926	68.2	78.2	84.0	80.0	74.2	3.3	7.2	8.8	6.5	88	82	do	do	do	
28	.964	.968	.970	.915	69.1	75.8	84.1	81.3	73.5	3.1	5.7	9.2	3.9	85	85	do	do	do	
29	.970	.993	.958	.912	68.5	77.3	85.0	80.7	70.8	1.1	5.6	9.3	6.1	92	81	do	do	do	
30	.988	.950	.930	.967	66.0	74.5	84.0	80.3	69.0	3.3	7.4	13.5	8.0	86	72	do	do	do	
Mean,	29.953	30.029	.926	.978	70.3	79.0	89.2	82.1	74.7	3.9	6.9	10.1	6.3	83	74	0.06	light day breeze.	steady fine.	

The instruments for 10 A. M. and 4 P. M. are suspended in the free air of the laboratory; those for 4 A. M. and 10 P. M. in the south veranda of a third story near the cathedral. The Barometers both stand .044 lower than the Surveyor General's.

